



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

**NEW MOLLUSCA OF THE SANTO DOMINGAN OLIGOCENE.**

BY H. A. PILSBRY AND C. W. JOHNSON.

The authors have had a revision of the fossils of Santo Domingo and Haiti, chiefly contained in the William M. Gabb collection, in preparation for some years. The work is now completed; but as some months must elapse before the illustrations can be published, advance descriptions are here given of most of the new forms.

The age of the Santo Domingan beds covered by the collections of Heneken and Gabb has been the subject of some uncertainty; but it appears that the lower bed or beds, containing *Orthaulax*, are nearly or quite equivalent to the *Orthaulax pugnax* zone of the Oligocene of Tampa Bay, while the upper beds, furnishing most of the fossils, are uppermost Oligocene, synchronous with the upper beds (Gatun formation) of the Canal Zone. We have found no evidence of Pliocene or other beds between the Upper Oligocene and the Pleistocene.

Illustrations of the species here described will appear in the complete report, now awaiting publication.

**ACTEONIDÆ.*****Acteon subtornatilis* n. sp.**

*Actæon tornatilis* Linn., Gabb, Trans. Amer. Philos. Soc., XV, p. 245.

Shell similar to *A. tornatilis* of Europe in size and form, but as coarsely sculptured over the whole body-whorl as that species is on the base. There are about 35 subequal spiral grooves on the last whorl, cut into square or oblong pits by narrow vertical lamellæ, the grooves separated by flat-topped ridges which are wider than the intervals except on the base, where they become narrow, no longer flat-topped, and about equal in width to the intervening grooves. Length 17, diam. 8.4, length of aperture 12 mm.

This form was referred to *A. tornatilis* by Gabb, but it differs in having the sculpture coarser and equally developed over the whole body-whorl, not finer and fainter in the middle as in the well-known European species.

Type No. 3183.

***Acteocina subbullata* n. sp.**

This species is almost identical with *A. bullata* (Kilner) in form

and size, but the aperture is slightly narrower above, and except close to the base there is *no spiral striation*.

Length 10, diam. 4.6 mm.

Type No. 3193.

***Retusa biforis* n. sp.**

The shell is perforate at both ends, cylindric, smooth. Above it tapers to an angle around the concave summit, which has a small perforation. Aperture is about twice as wide in the lower as in the upper part. The lip recedes strongly at both ends. Columella straight, the columellar margin somewhat reflected, the whorl narrowly excavated below the perforation.

Length 3, diam. 1.4 mm.

Type No. 3192, A. N. S. P.

***Volvula ornata* n. sp.**

The shell is moderately obese, tapering downward, with sculpture of small axial folds near the summit, spiral impressed lines around the base. Spine is moderately long, obtuse.

Length 3.75, diam. 1.7 mm.

Type and 7 other specimens are No. 3178, A. N. S. P.

***Volvula parallela* n. sp.**

The shell is extremely fragile, slender, cylindric, showing extremely faint and fine spiral striation in the lower half. The spine rises well above the lip, is rather short and acute. The columella is a little convex.

Length 2.2, diam. 0.75 mm. (type).

Length 3 mm. (largest specimen).

All of the three specimens are somewhat broken. It is the most fragile and slenderest *Volvula* we have seen.

Type No. 3188.

***Volvula cylichnoides* n. sp.**

The shell is rimate, oblong, the right side less convex than the left, the surface smooth so far as can be seen. The lip rises high above the vertex, which shows no trace of a spine, and is narrowly rounded above. Columella nearly straight.

Length 4.4, diam. 2 mm.

Type No. 3177, A. N. S. P.

This species appears to be closely related to the unfigured recent *V. aspinosa*, but there is no trace of the rudimentary spine described for that species.

***Atys cinctorii* n. sp.**

The shell is perforate, very shortly fusiform, swollen and smooth in the middle, rapidly tapering and encircled with impressed lines towards the two ends. The vertex is narrowly concave, plain. Columella prominent in the middle.

Length 2.6, diam. 1.35 mm.

Type No. 3185, A. N. S. P.

The lip is somewhat broken. It resembles the Chipolan *A. ædemata* Dall, but has not the ornamentation of the vertex seen in that species; and the columella is rather strongly prominent in the middle. In *ædemata* it is figured as straight.

***Atys sulcutorum* n. sp.**

Shell imperforate, short, swollen, with sculpture of about 15 encircling grooves, which are widely spaced in the middle; low and rather close vertical folds are seen in the upper part. They pass over the vertex and converge to the axis. Summit concave. The columella is rather thick, terminating in a prominent plait.

Length 2.3, diam. 1.35 mm.

Type No. 3317, A. N. S. P.

***Terebra baculiformis* n. sp.**

The shell is very slender, of nearly flat whorls. These have axial sculpture of narrow, continuous, retractive, arcuate riblets, and spiral sculpture of unequal cords and threads, which are weak where they pass over the riblets. A narrow, convex posterior fasciole has about 6 fine, unequal spiral threads, and is defined by a rather deep sulcus, also striate. Below the sulcus there are about 7 unequal cords, followed below by a group of finer threads. On the last whorl the axial riblets are sigmoid and extend to the siphonal fasciole the uneven spiral striation covering the same portion. The anterior channel is rather long for this genus, narrow. The columella is smooth and very weakly sigmoid, being less bent than in most *Terebras*.

Length 30, diam. 5 mm.; 10½ whorls remaining.

The type is No. 2906, A. N. S. P.

***Terebra hitia* n. sp.**

The shell is very slender, with slightly convex whorls. Sculpture of many narrow axial riblets, narrower than their intervals, retractive above, vertical in the lower two-thirds. Below the suture there are two spiral cords under the ribs, followed by a deeper sulcus and then a prominent spiral, below which there are about 6 spiral

cords, unequally spaced, with some small spiral striæ in the widest space. The last whorl is largely broken away. The columella shows one very low, rounded plait.

Length 24, diam. 5 mm.;  $11\frac{1}{2}$  whorls remaining.

Type No. 2905, A. N. S. P.

***Drillia sororecula* n. sp.**

A shell with much the appearance of *D. ischnatracta*, but differing by the much shorter aperture, less produced anterior canal, and the absense of spiral striæ in the intervals of the spiral cords. The latter are quite low and rounded, equal to their intervals. On the last whorl there are 13 between the anal and siphonal fascioles, on the whorls of the spire 5, with another following the suture. The anal fasciole is excavated, without distinct spiral striation.

Length 40.5, diam. 12 mm.; length of aperture 19 mm. 9 whorls remaining, the apical ones broken off.

Type No. 2929, A. N. S. P.

***Drillia subgibbosa* n. sp.**

*Turris (Drillia) gibbosa* Chemn., Gabb, Tr. Am. Philos. Soc., XV, p. 208. Not of Born.

The penult whorl is crossed by about thirteen rather sharp axial ribs which weaken abruptly where they cross the concave anal fasciole. Some short ribs are intercalated on the last whorl. The back is humped by a broad, prominent varix. The anal fasciole is without spiral sculpture; below it there are six spiral grooves between the ribs on the whorls of the spire, and on the last whorl about fourteen, here passing over both valleys and ribs. The anal sinus is deep, separated from the preceding whorl by a heavy callous pad. Siphonal fasciole is prominent.

Length 53.3, diam. 19 mm.; about 10 whorls.

Though resembling the recent *D. gibbosa*, this form is at once distinguishable by the less regular axial ribs, which do not end abruptly at the shoulder, but continue weakly to the suture; also by the less contracted anterior canal.

Type and a smaller specimen are No. 2920, A. N. S. P.

***Drillia elocata* n. sp.**

*Drillia henekeni* Sow., Cossmann, Jour. de Conchyl., LXI, 1913, p. 25, Pl. 3, figs. 10, 11. Not of Sowerby.

This shell resembles *D. fusiformis* Gabb in sculpture, but differs by the far shorter anterior canal. The whorls are strongly convex, with sculpture of large, rounded, slightly protractive ribs, 6 on the penult, 7 on the last whorl. These ribs distinctly undulate the anal

fasciole. Between sutures there is a strongly undulating presutural spiral followed by several very small spiral striæ on the anal fasciole, which is not excavated or concave, and three strong cords, a fourth barely appearing above the suture. Between these cords some very fine and weak spiral striation is visible. On the last whorl there are 17 spiral cords in addition to the presutural cord. There is a strong varix a short distance behind the lip. Anal sinus deep and rounded.

Length 25.5, of last whorl 14, diam. 9.7 mm.

Type No. 3296, A. N. S. P. Seventeen other examples are No. 3295.

Some specimens are more slender, the most lengthened being 26.5 mm. long, 8.3 wide.

It appears to stand close to *D. severina* Dall, but that species has a wider, "distinctly excavated" anal fasciole, and a relatively longer last whorl.

***Drillia callistura* n. sp.**

The spire is straightly turreted, sculptured with regular, acute, slightly protractive axial ribs, of which there are 18 on the penult whorl. The ribs terminate abruptly above, leaving a narrow, deeply concave anal fasciole which is bounded above by a spiral cord a little distance below the suture. In the posterior fasciole and between the axial ribs there are close, fine spiral threads, and weakly marked growth-lines, more obliquely protractive than the ribs. On the last whorl the ribs gradually diminish downward, and are wanting on the narrow anterior end, and the lower half has rather coarse spirals. A rather strong varix stands close behind the lip. There are about 9 acute liræ within the outer lip.

Length 22, diam. 8, length of aperture 9 mm.; 8 whorls remaining in the type, which has lost the apical whorls.

Type is No. 2907, A. N. S. P. One specimen.

This species is closely related to *D. jamaicensis* Guppy (*D. ebenina* Dall), from which it differs by having the anal fasciole evenly and distinctly striated spirally, with no trace of the close, arcuate growth-ridges, which predominate in *jamaicensis*. The anal sinus is not nearly so deep and not contracted in front. The throat is lirate. The spire has straight outlines. Finally, it attains a somewhat larger size.

***Drillia ischnatracta* n. sp.**

The shell is fusiform, the two apical whorls smooth, following

whorls of the spire with about nine slightly protractive axial ribs, which do not cross the concave anal fasciole. There are numerous, acute, spiral threads alternating with smaller ones. On the penult whorl there are seven of the larger threads below and two or three above the anal fasciole. Between the alternating threads are still finer spiral striæ. On the last whorl, where the axial ribs become irregular, partly obsolete, the spiral sculpture remains the same; there being about 28 larger spirals below the shoulder. The anal fasciole is minutely striate spirally.

Length 51.4, diam. 13.5 mm.

Length 53.4, diam. 13.5 mm., length of aperture 25.5 mm.; 11 postnephronic whorls.

Type No. 2904.

This differs from *D. henekeni* by the more slender shape, with much lower ribs, which become weak and irregular on the last whorl. The inter-liral spaces are densely, finely striate, while in *D. henekeni* they are smooth.

In many specimens the spirals do not alternate in size as described above, the intervals having fine, unequal or subequal spiral striæ.

***Drillia scala* n. sp.**

The shell is fusiform, whorls strongly convex, concave just below the suture. Penult whorl with sixteen acute axial ribs, nearly vertical except for a short backward curvature below the suture, where the ribs diminish abruptly in size. In the intervals there are fine, rounded, spiral threads, scarcely as wide as their interstices; between them much more minute growth-lines may be seen. There is a strong, latero-dorsal varix. The aperture is somewhat broken.

Length 45.5, diam. 17 mm.

This species resembles *D. squamosa* in form but the *acute* not *nodose* longitudinal ribs, the *regular* revolving sculpture at once separate it from that species. On the other hand it is related to *D. venusta* but is at once distinguished by its long anterior canal, fewer longitudinal ribs and more numerous spirals. The fine lines of growth between the spiral lines are wanting in *D. venusta*.

Type and a broken specimen are No. 2932.

***Drillia hexapleura* n. sp.**

A small species with nearly straight sided spire upon which the limits of the whorls are difficult to make out. Sculpture of 6 very broad, low, rounded axial ribs, continuous from whorl to whorl. These are crossed by strong spiral cords, which are a little narrower

in the intervals. Each whorl of the spire has two of these cords below and one above the concave anal fasciole, in which a few weak spiral striæ may be seen. On the last whorl there are 11 spirals below the fasciole, the intervals somewhat distinctly marked with growth-striæ. There is a stout varix behind the outer lip. The aperture is rather narrow.

Length 8, diam. 3.5 mm.; about 6 whorls remaining.

The small number of spiral cords and very wide axial ribs distinguish this species. It is closely related to the Pliocene *D. acucincta* Dall, 1890, a very much larger species. The strong varix behind the lip of *D. hexapleura* shows that it is adult.

***Drillia mimula* n. sp.**

The shell closely resembles *D. parkeri* in ribbing, except that the ribs do not extend so far down on the last whorl. The whorls and the whole shell are shorter, the last much more abruptly contracted below. The smooth embryonic shell has only  $1\frac{1}{2}$  bulbous whorls, the ribs beginning strongly in the middle of the second whorl. There is a microscopic sculpture of crowded spiral striæ. Aperture broken.

Length 16.5 mm. (broken anteriorly), diam. 5.8 mm.; nearly 10 whorls.

Type No. 2925.

***Drillia esculenta* n. sp.**

The shell is fusiform, of 10 whorls, the first  $2\frac{1}{2}$  forming the embryonic shell are smooth and convex. Subsequent whorls are concave in the upper third, then convex, with sculpture of rounded, slightly protractive axial ribs, which become lower and arched backward as they cross the concave zone. There are 15 ribs on the penult whorl; last whorl having a stout dorsal varix. A few ripples along growth-lines may be seen, more obliquely protractive than the ribs. In the intervals and more weakly over the ribs there are crowded, very fine spiral threads. The aperture is broken, but the inner lip is continuous, rather heavy, and built forward.

Length 13.3, diam. 5 mm.

Three specimens are in the lot, the figured type having been bored by a predaceous gastropod. The minute sculpture differentiates it from other species of the same horizon.

Type No. 2922.

***Drillia orthopleura* n. sp.**

The shell is slender, fusiform, with sculpture of strong longitudinal ribs, continuous from whorl to whorl, and smooth except for fine

growth-wrinkles. The ribs are lower on the anal fasciole, which is limited below by an inconspicuous cord. The ribs disappear on the anterior canal. The siphonal fasciole is banded above by an acute cord. Columella is nearly straight. Outer lip broken.

Length 14, diam. (estimated) 5 mm.; 8 whorls, several at the apex lost.

Type No. 3198, A. N. S. P.

***Drillia callistopleura* n. sp.**

Shell fusiform, of  $11\frac{1}{2}$  whorls. Embryonic  $1\frac{1}{2}$  whorls smooth, the first one inflated; three following whorls are angular above the suture, after which the whorls become convex, having slightly protractive axial ribs and spirally striated intervals. On the penult whorl there are nineteen axial ribs, which are slightly lower and a little arcuate below the suture. Between the axial ribs, on the spire, there are rounded spiral cords, about as wide as their intervals, twelve on the penult whorl; on the last whorl they number about thirty-six. Anteriorly the ribs weaken and the spirals pass over them. There is a prominent dorsal varix. Aperture imperfect.

Length 22.4, diam. 7 mm.

The smooth axial ribs, and uniform, close, revolving cords distinguish this species. It is nearly related to the following.

The type and 4 specimens are No. 2921, A. N. S. P.

***Drillia lissotropis dorsuosa* n. subsp.**

*Cf. Drillia lissotropis* Dall, Bull. Mus. Comp. Zool. IX, 1881, p. 58; XVIII, 1889, p. 91, Pl. 11, figs. 3, 4, and *D. lissotropis* var. *perpolita* Dall.

This form has eight or nine smooth ribs on each whorl. They extend from suture to suture, not being interrupted below the suture. Suture bordered below with an uneven ridge, the intercostal valleys slightly pitted below the ridge. There is a rather prominent varix about one-fourth whorl behind the aperture. The outer lip is broken away. A callous nodule on the body borders the posterior sinus.

Length 8.8, diam. 3 mm.; 9 whorls.

***Drillia foveolata* n. sp.**

There are twelve rounded, slightly protractive ribs on the penult whorls, the intervals having sharply impressed spiral lines, seven on the penult whorl. There is a low, rounded ridge below the suture, the intercostal valleys somewhat pitted below it. There is a prominent varix about one-fourth whorl behind the aperture. The outer lip is broken.

Length 14.3 diam. 5 mm.;  $11\frac{1}{2}$  whorls.

The type and two other specimens are No. 2958, A. N. S. P. The type is somewhat smaller than the others, both of which have been bored by predaceous snails.

***Clathurella amica*** n. sp.

Resembles *C. gracilis*. It is less slender and the whorls are shorter and revolve less obliquely. It has the same number of axial ribs and spiral threads, but, as they are relatively larger, they are much more crowded than in *C. gracilis*. The fine spiral lines between the prominent raised threads are very minute. The lip varix is noticeably larger, and the mouth is wider; the callous nodule on the body next to the sinus is much larger than in *C. gracilis*.

Length 16.3, diam. 5.25 mm.; aperture 7.5 mm.

It is allied to *C. vendryesiana* Dall,<sup>1</sup> but the prominent axial ribs over the whole shell differentiate it.

Type is No. 2913, A. N. S. P.

***Scobinella tristis*** n. sp.

The shell is fusiform with turritid spire. The whorls are strongly angular at the shoulder, rather deeply concave between the shoulder and a strong, beaded ridge below the suture. There are four spiral cords in the concavity. At and below the shoulder there are about 24, deeply beaded spiral cords, the beads arranged in protractive curves. On the penult whorl there are four spirals below the shoulder, which has a bifid spiral. The aperture is very narrow. The outer lip of the type has been broken during the life of the animal, and is thicker than normal, lirate within. The long, straight columella bears two strong, mitriform plaits, and there is the faint trace of a third one.

Length 45.8, diam. 13, length of aperture 26 mm.; 6 + whorls remain, the upper ones being lost.

Type No. 2927, A. N. S. P.

This is a shorter, less graceful shell than *S. magnifica*, with the whorls more strongly shouldered, more concave above the shoulder, and with a stronger presutural cord. *Scobinella morierei* (Cossm.) has a shorter anterior canal. *S. cœlata* Conrad is smaller and less fusiform.

***Conus furvoides brachys*** n. subsp.

The shell is shorter than *furvoides*. The last 4 whorls are concave and weakly striate spirally. It stands close to *C. concavitectum* B. & P., of Gatun, but that species has more copious and granulous

<sup>1</sup> *Proc. U. S. Nat. Mus.*, XIX, 1896, p. 306, Pl. 27, fig. 1.

spiral striæ in the lower half, and the spiral striation of the spire is distinct.

Length 33.5, diam. 17.3 mm. (type).

“ 38, “ 20.5 “

***Conus xenicus* n. sp.**

The shell is broad above, the diameter about two-thirds of the length; spire low, its outline strongly concave, rising to an acute apex; periphery carinate, the slopes below it nearly straight. The early whorls have a smooth keel, projecting above the suture, but the last five are flat, with very weak traces of spiral striæ, and separated by a plain, narrowly impressed suture. The last whorl has coarse, well separated spiral cords on the anterior end, but under suitably oblique light very faint spirals may be seen throughout. The faint growth-striæ retract rather strongly near the shoulder. The aperture is very narrow.

Length 29, diam. 19 mm. (type).

“ 27, “ 17 “

Besides the type, No. 2575, A. N. S. P., there are three other specimens in the lot. It was labeled “*Conus* sp. ?, monstrosity” by Gabb, but none of the specimens shows any trace of injury, and we have every reason to believe that they are entirely normal.

***Conus perlepidus* n. sp.**

*Conus planiliratus* Sby., Gabb. Trans. Amer. Philos. Soc., XV, 1873, p. 230.  
Not of Sowerby.

The shell is rather slender, with somewhat concavely conic spire of about 12 whorls, which are flat, marked with raised, arcuate striæ, and have an angle projecting very little above the suture. Last whorl is rather actually angular, the sides nearly straight below the angle, with sculpture of about 22 spiral furrows half as wide as the flat intervals; the furrows being cancellated by raised axial threads. The posterior sinus of the aperture is deep. Aperture of about equal width throughout.

Length 44, diam. 18, length of aperture 38 mm.

Gabb referred the specimens of this species to *C. planiliratus*, but Sowerby's phrase “*Testa turbinata, crassa*” could hardly have been applied to such “a long, narrow species” as this. Gabb refers, also, to Guppy's figure in Quarterly Journal of the Geological Society, XXII, Pl. 16, fig. 7, which agrees well with Sowerby's brief diagnosis of *C. planiliratus*, but not with the present species.

The type and five other specimens are No. 2569, A. N. S. P. In

small specimens, 22 mm. long, the spiral grooves are equal in width to the flat intervals.

***Conus trisculptus* n. sp.**

The shell is biconic, the spire composed of slightly concave whorls, with a low carina projecting above the suture. On the last  $2\frac{1}{2}$  whorls this carina bears low nodes (about 20 on the last whorl), but on the earlier whorls the keel is smooth. The upper slope of each whorl has prominent, arcuate radial striae but no spirals. Below the shoulder the surface is slightly convex, contracted a little above the base. The lower half has about 13 spiral grooves, widely separated except close to the base; and except on the anterior fourth there are spiral series of small pustules which are slightly lengthened in the axial direction, and are arranged in vertical rows, but somewhat irregular in places.

Length 34.5, diam. 16.5 mm.; length of aperture 27 mm.

Costa Rica, Pliocene. W. M. Gabb. Type No. 2567, A. N. S. P.

This cone was with the lot of *C. consobrinus ultimus*, from which it is at once separable by the smooth keel of the upper whorls.

***Conus consobrinus ultimus* n. subsp.**

*Conus consobrinus* Sby., Gabb, Journ. A. N. S. Phila. 2 Ser., VIII, p. 359.

Shell more squarely shouldered than *C. consobrinus*, and with tubercles extending upon the angle of the last whorl.

Length 52, diam. 24.3 mm.

Costa Rica, Pliocene. Collected by W. M. Gabb. Type and five other specimens are No. 3322, A. N. S. P.

***Conus longitudinalis* n. sp.**

The shell is about twice as long as wide, with nearly straightly conic, elevated spire of about 10 whorls. These are flat, with an angle projecting above the suture and on the last whorl. There are slightly arcuate, protractive striae above. The last whorl, below the shoulder is coarsely corrugated vertically, the wrinkles somewhat irregular. The anterior third has narrow, spiral grooves, the upper three widely spaced, the rest in pairs, and all crossed by axial threads.

Length 35, diam. 17.5 mm.

This species is remarkable for its coarsely wrinkled surface. It is known by one specimen with the outer lip extensively broken, and the spire and part of the last whorl of another.

Type No. 2574, A. N. S. P.

**Conus simplicissimus** n. sp.

*Conus berghausii* Mich., Gabb, Trans. Amer. Philos. Soc., XV, 1872, p. 232.  
Not of Michelotti.

The shell is thick, stout, the diameter more than half the length, smooth except for delicate growth-lines. Spire conic with concave outlines, the whorls nearly flat, the upper ones angular above the suture. Shoulder rounded, the lateral slope below it somewhat convex, showing very faint traces of five spiral series of rather large reddish spots. Above the shoulder there are some oblique reddish flames. No spirals near the base or elsewhere. Aperture is somewhat widened in the lower third.

Length 68, diam. 42 mm.

" 63, " 33.5 " ; whorls 11 (type).

" 41, " 25.5 " .

A cone of very simple form, differing from others of somewhat similar contour by the absence of spiral sculpture. *C. recognitus* is much more contracted anteriorly, and has weak spiral striæ.

The smallest specimen of the three is that which Gabb referred to *C. berghausii* Mich., an Italian Tertiary species. Dr. Dall has included *C. berghausii* Gabb in the synonymy of *C. proteus*, but it differs from that by the swollen shape, and is certainly distinct.

Type No. 2549.

**Conus porcellus** n. sp.

*Conus cedo-nulli* Brug., Gabb, Trans. Amer. Philos. Soc., XV, 1872, p. 232.

The shell is broad, the diameter about two-thirds of the length. The spire is low-conic with slightly concave outlines, composed of about 10 whorls, the later two or three concave above, earlier ones flat, a few showing a slightly projecting angle above the suture; lightly sculptured with arcuate growth-lines. The shoulder of the last whorl is well rounded; lateral slope convex in the upper part, then straight. A siphonal fasciole is defined by an oblique, spiral ridge, below which there are four spiral cords. Above the ridge there are about 10 narrow, widely spaced spiral cords, each bordered above by a slight gutter which is striated vertically. The upper third of the last whorl is nearly smooth, but under a lens it shows faint, widely spaced spirals, either slightly raised or indicated by gray lines.

Length 29.3, diam. 19 mm.; length of aperture 25 mm. (type).

" 38, " 24 " (largest specimen).

Type No. 2546.

A series of several hundred specimens is in the collection, the type

being contained in No. 2556, A. N. S. P. We are utterly at a loss to account for Gabb's reference of the shell to *C. cedo-nulli*, which is entirely different.

The sculpture is rather variable, as usual in *Conus* some individuals showing raised spirals nearly up to the shoulder, while in other the upper half may be smooth.

***Conus pernodosus* n. sp.**

The shell is rather slender, the diameter not quite half the length; spire produced, slightly concave in the upper part, of about 9 whorls, which are slightly concave and spirally striated above, with a projecting periphery which is set with somewhat pointed tubercles on the last  $3\frac{1}{2}$  whorls. On the angle of the last whorl there are 11 tubercles. Below the angle the outline is very slightly convex. Surface closely sculptured with flat-topped spiral cords about twice as wide as the intervals (37 below the angle of last whorl); intervals are sharply sculptured with axial threads.

Length 23.3 (imperfect at base); diam. 12.3 mm.

With the type, No. 2552, A. N. S. P., there are two young shells about 15 mm. long, which show tubercles on the last whorl only. The upper whorls, in this species, have a smooth, projecting periphery.

***Conus gabbi* n. sp.**

The shell is rather slender, stoutly fusiform, with a concavely conic spire of about 11 whorls; all post-embryonic whorls have a tubercular keel projecting above the suture. Upper surface of each whorl is slightly concave, with about 5 unequal spiral threads crossed by prominent, arched, unequal striæ. Below the shoulder of the last whorl the slope is at first convex, becoming slightly concave in the lower part. It is sculptured with about 37 smooth, rounded spiral ribs narrower than their intervals, which are elegantly cancellated by close raised axial threads. The aperture is rather narrow throughout.

Length 43, diam. 17.5 mm.; length of aperture 35 mm.

The number and spacing of the spiral ribs is somewhat variable. In one specimen 35 mm. long there are only 24 spiral ribs. *Conus tortuosostriatus* Toulou (1911), from the Panama Canal, resembles this species somewhat, but it has fewer and flattened spirals, and there are some fine spiral threads in the furrows. It seems also to be more contracted in the lower part.

The type and four other specimens are No. 2553, A. N. S. P.

***Conus larvatus* n. sp.**

The shell is extremely slender, the length about  $3\frac{1}{2}$  times the diameter, fusiform. Spire produced, composed of flat whorls, the beaded periphery projecting above the suture; apical whorls lost. The last whorl is angular, the angle set with 25 bead-like tubercles, which are a little lengthened in the spiral direction; elsewhere, above and below the angle, it has close, even fine spiral cords with very sharp axial striation in the intervals. Upward, towards the shoulder, the striae slowly retract. The aperture is extremely narrow. The inner lip is excavated in its lower fourth.

Length (truncated) 33, diam. 9.5 mm.;  $5\frac{1}{2}$  whorls remaining.

Type No. 2550, A. N. S. P.

This species, *C. gabbi* and *C. pernodosus*, were lumped by Gabb under *C. orbignyi* Audouin, a recent species inhabiting the Eastern Seas. *C. gracilissimus* Guppy, from the Oligocene of Jamaica, is closely allied, but it is a distinct species, with wide, flat, revolving costae.

*C. larvatus* is narrower than *C. tortuosostriatus* Toulou, and differs conspicuously in contour. Toulou's species has more resemblance to *C. gracilissimus* Guppy.

***Cancellaria gabbiana* n. sp.**

The shell is short, turbate solid, of about 7 whorls. The bulbous embryonic shell consists of  $1\frac{3}{4}$  convex, smooth whorls. Following whorls have slightly retractive axial ribs much narrower than their intervals, about 18 on the last whorl. At intervals of about a half whorl there are rather broad varices. There are 18 spiral cords hardly half as wide as their intervals and passing over ribs and varices. Siphonal fasciole is prominent, surrounding a small umbilicus. The aperture is large, oval; outer lip is somewhat effuse at the outer-basal part, but not retracted; sculptured within with 14 sharp lirae. Columellar plaits are not very strong, the upper one thin, middle one somewhat blunt. A broadly spreading but thin parietal callous coats the face in front of the aperture.

Length 24.5, diam. 19.4 mm.; length of aperture 17 mm.

The type and another specimen were among unassorted material. No. 3288, A. N. S. P.

***Cancellaria (Trigonostoma) insularis* n. sp.**

*Cancellaria brevis* Sby., Gabb, Tr. Am. Philos. Soc., XV, 1873, p. 236. Not of Sowerby.

? *Cancellaria (Trigonostoma) aff. C. bullata* Sow., Toulou. Jahrb. k.k. Geol. Reichsanstalt, LXI, p. 504, Pl. 30, fig. 10.

The shell is short and broad, openly umbilicate, solid. There are

$1\frac{1}{2}$  smooth, strongly convex embryonic whorls,  $4\frac{2}{3}$  subsequent whorls, which are separated by a very deep y channelled suture; the last whorl therefore being bluntly carinate above and at the base. Sculpture of strong, narrow, retractive axial ribs, 14 on the last whorl, passing over the carinae at summit and base; crossed by numerous, unequal, low spiral cords. The aperture has two strong liræ within the straight upper margin, eleven within the outer. The inner lip has many entering wrinkles, and three columellar plaits, the anterior one low and obtuse.

Length 24.5, diam. 21 mm.

Type is No. 2989, A. N. S. P.

This species is not at all like the recent *C. brevis* Sowb. It closely resembles *C. perspectiva* Conr., of the Chesapeake Miocene, but differs in its more rugose aperture and narrow, irregular ribs, which in *C. perspectiva* are wide and regularly alternating. The aperture and umbilicus are larger than in *C. depressa* Dall, of the Tampa silex beds. It differs conspicuously from *C. moorei* Guppy in the basal region.

A *Trigonostoma* figured by Toula, referred to above, appears to be close to *C. insularis*, perhaps specifically identical.

***Oliva proavia* n. sp.**

*Oliva cylindrica* Sby., Gabb. Tr. Amer. Philos. Soc., XV, 1873, p. 215 (*pars secunda*).

The shell is somewhat fusiform, the upper fourth of the last whorl and the spire tapering, forming a straightly conic spire. In its even surface the suture appears as an engraved groove, the individual whorls being flat. The first two whorls form a minute, mammillate apex. Whorls 9. The aperture occupies almost exactly  $\frac{3}{4}$  of the total length. Columella is rather heavily calloused, and bears about 21 very oblique plaits, of which all but about 10 in the median part are quite small. There are faint traces of a color pattern resembling that of *O. sayana* Rav.

Length 81.5, diam. 27, aperture 62 mm. (type).

“ 101, “ 37, “ 86.5 “

The type and a larger specimen are No. 2992, A. N. S. P.

Comparing the two large specimens with *O. sayana* Rav. (*O. litterata* Lam., *O. carolinensis* Conr.) we note the more slender contour and much more oblique columellar folds of *O. proavia*. A further important distinction is that the lateral contours of the spire are continuous across the suture in *proavia*, while in the other species the posterior edge of each whorl projects beyond the preceding.

The type specimen is quite perfect except that the lip is somewhat crushed in above, making the aperture appear shorter and narrower above than it really is.

***Oliva dimidiata* n. sp.**

The shell is small, cylindric, with conic spire and mamillate apex. The last three to four whorls are flat, covered with callous, and separated by channelled suture. The last whorl is encircled a little above the middle by a narrow groove. The basal fasciole has 6 strong ledges. There are 14 short folds on the columellar margin.

Length 12.2, diam. 5.3 mm.; length of aperture 9 mm.;  $6\frac{3}{4}$  whorls. Others measure 11.5 and 13 mm. long.

This was at first suspected to be a young stage of *O. gradata*; but that species is longer when it has the same number of whorls. Moreover, the narrow ledge of *gradata* is unlike the groove of this species. It is closely related to the recent *O. undatella* Lam. of the west Mexican coast but is less inflated, and to judge by the three examples in the typical lot, it does not become so large.

Type No. 2804.

***Marginella nugax* n. sp.**

The shell is very small, biconic, of four slightly convex whorls; apex obtuse. The suture ascends strongly in front. Aperture narrow. Outer lip broad, thickened, the inner margin having 8 teeth, the upper fourth without teeth. Columella with four plaits.

Length 3.7, diam 2 mm.

Type No. 2802, A. N. S. P.

Though very small, the lip has a conspicuous external varix.

***Mitra tortuosella* n. sp.**

The shell is fusiform, slender, with sculpture of acute axial ribs (about 14 on each whorl), the concave intervals between them having spiral impressed lines which do not pass over the smooth summits of the ribs. There are 7 or 8 such impressions in each interval on the penult whorl. On the narrow anterior half of the last whorl there are well separated spiral cords. The outer lip is sculptured within with five slender liræ. There are four columellar plaits.

Length 18.5, diam. 6 mm.; 8 whorls, the embryonic being lost.

Type No. 3285, A. N. S. P.

This is closely related by its sculpture to *M. tortuosa* but it differs by the very slender form. A young *M. tortuosa* 16.3 mm. long has a diameter of 7 mm.

In some of the intercostal intervals there is a median longitudinal groove.

**Mitra tortuosella frater** n. subsp.

This form is closely related to the preceding, but differs by having deeply cut spiral grooves about as wide as the raised cords, in the intercostal intervals. There are 7 or 8 grooves on the penult whorl, which has 15 slightly arched axial ribs. The anterior canal is shorter than in *M. tortuosella*.

Length 14.7, diam. 5 mm.; 8 whorls, the apical ones lost. Further series are needed to determine the value of the differences between this form and the preceding.

Type No. 3286.

**Mitra mesolia** n. sp.

The shell is short and stout. Sculpture of a few impressed spiral lines on the upper part of the last whorl and the spire, 6 on the penult whorl, the anterior end having about 9 low spiral ridges, with faint traces of spirals above them, the middle part of the last whorl being smooth. Lip thickened within in the lower three-fourths, smooth; 4 columellar plaits.

Length 20 (apical whorls wanting), diam., 9.5 mm.

This species is shorter than the Californian *M. maura* which it resembles. In a younger specimen only a small part of the last whorl is unsculptured.

Type No. 3275.

**Plochelaea gabbi** n. sp.

The shell is smaller than *P. crassilabrum*. Spire concavely conic, of  $7\frac{1}{3}$  flat whorls. First 2 whorls form a nipple-like apex; the next 2 or 3 are very delicately striate spirally; subsequent whorls showing faint growth-lines only. Suture not impressed, suddenly ascending to or very nearly to the summit of the last whorl, in front. Last whorl has more convex outlines than *P. crassilabrum*, and terminates in a very low, wide varix. The outer lip is subacute in the upper part, but a little blunt and slightly reflected in the lower half. It is not inflected. The upper third of the aperture is narrow, lower two-thirds dilated, widest just above the basal channel, which is deep and recurved. There are 4 narrow, nearly horizontal columellar plaits, and above them 3 distinct and one or two vestigial, smaller, slightly ascending plaits in one specimen, but in the type only two short plaits above the four strong ones.

Length 25 , diam. 12.7, length aperture 22.3 mm.

" 27.4, " 12.7, " " 24.2 " (type).

The shorter spire, strongly ascending anterior end of the suture, and the straightened but not inflected outer lip, amply distinguish

this species from the larger *P. crassilabrum*, with which it was lumped by Gabb.

Type and one paratype are No. 3290, A. N. S. P.

**Xancus rex** n. sp.

*Turbinella valida* Sby., Gabb, Tr. Am. Philos. Soc., XV, 1873, p. 218. Not *Turbinellus validus* Sowerby.

The shell is biconic, large and ponderous, the periphery about median. First whorl distorted, bulbous, smooth, next whorl contracted and narrow. Succeeding whorls have massive axial folds, 6 or 7 on a whorl, traversed by about 7 spiral cords. After the mid-neanic stage the spiral sculpture weakens, and the folds gradually give place to strong tubercles at the shoulder. On the last whorl of the type there are 12 such tubercles. Above the shoulder there is a steep, slightly concave slope to the suture, the surface being conspicuously, finely plicate and having a few spiral cords, which are indistinct in the adult stage. The whorl is appressed at the suture, the axial wrinkles becoming strongly retractive laminae there. The basal half of the last whorl has many spiral cords. The inner lip is heavily calloused, columella with 3 strong plaits.

Length (as broken) 212, diam. 117 mm. (type).

" 155, diam. 62 mm.

This species differs from the recent *X. scolymus* by the shorter spire, coarser sculpture above the shoulder, smaller and more numerous tubercles at the shoulder, etc. The whorl slopes much more steeply above the shoulder than in *X. wilsoni* or *X. polygonatus*.

The type, No. 2628, A. N. S. P., and a series of 35 specimens of various ages are in the collection.

The description of the embryonic whorls is from a paratype.

**Vasum pugnus** n. sp.

The shell is biconic; spire elevated, the whorls having rounded peripheral nodes, about 8 on a whorl, and spiral threads, about 12 with a few minor ones, on the penult whorl. On the last whorl there are short, thick axial folds extending a short distance downward from the shoulder, and an inferior row of blunt tubercles. From the shoulder down there are low, well-spaced spiral cords, with about 3 smaller spirals in their intervals.

Length 80, diam. 50 mm.

The spire is higher and more straightly conic and the last whorl not so wide as in *V. muricatum*, the spiral threads on the spire are much smaller.

Type No. 2626, A. N. S. P.

**Melongena orthacantha** n. sp.

The shell has a shortly conic spire, angular periphery, below which it tapers rapidly. At the periphery there are short radiating spines rising from short folds, which corrugate the upper surface. The last whorl has 12 spines. There is an inferior ridge armed with spines, and a prominent siphonal fasciole. Below the suture there is a convex nodulose or scaly fasciole. The surface has also numerous spiral cords, ten between the peripheral and inferior series of spines. The aperture is smooth within.

Length 29.7, diam. 25.5 mm.;  $5\frac{1}{2}$  whorls (type).

“ 36.2, “ 31.2 “ (worn adult).

The type and two paratypes are No. 2956, A. N. S. P. The type is a perfect but not quite adult specimen. A fully adult but worn (beach rolled) shell has 10 peripheral tubercles on the last whorl; the fold-like character is scarcely noticeable in this stage. The sutural fasciole is more prominent.

In a somewhat broken specimen 35.5 mm. long there are smaller spirals in part of the intervals, increasing the number mentioned above by about one-half. This specimen has ten spines on the last whorl.

**Anachis gracilicostata** n. sp.

The type specimen has 7 whorls, the first three smooth, the rest with about 27 straight, axial riblets at least as wide as their intervals; no spiral sculpture above the periphery; below it there are fine spiral lines between the riblets, and on the anterior third about 8 spiral cords. The aperture is about half the total length of the shell.

Length 4.7, diam. 2 mm.

Two specimens were found in the lot of *A. exilis*. As both are immature, the aperture cannot be described; but the characteristic sculpture, unlike any other shell of these beds, will insure recognition of the species. Type and another are No. 2803, A. N. S. P.

Another species of Columbellid is represented by specimens too imperfect for diagnosis.

**Strombina politissima** n. sp.

The spire tapers regularly, and is composed of 7 convex whorls, separated by an impressed suture, which does not ascend in front. A prominent, rounded varix strengthens the lip, which has a small tubercle within near the posterior insertion, another at the beginning of the anterior canal. There is a small entering callus on the parietal wall posteriorly. Surface smooth and highly polished except at the base, where there are about 14 obliquely spiral cords.

Length 7.1, diam. 3.4 mm.

Type No. 2801, A. N. S. P.

One specimen was found with the large lot of *S. haitensis*. It resembles that species in shape but not in sculpture.

***Metulella dominicensis* n. sp.**

The long spire has very slightly concave outlines. The embryonic shell is glossy and smooth, of  $1\frac{3}{4}$  convex whorls, the first one rather large. Following whorls are very slightly convex, angular a short distance above the suture, which is in a channel. Sculpture of close, fine axial ribs, at first smooth, but at the third a few weak spiral cords appear, stronger in the intercostal spaces. On the penult whorl there are 3 or 4 such cords; on the last whorl about 5 from the periphery up; just below the periphery there is a zone without spirals, then about 20 stronger spirals on the lower part. There are about 7 teeth within the outer lip, and 5 or 6 on the columella.

Length 16.4, diam. 5.2 mm.;  $8\frac{1}{2}$  whorls.

Type No. 3217, A. N. S. P.

Closely related to *M. fusiformis*, but the whorls are less convex, the spiral sculpture far weaker and the shell is more slender.

***Thais santodomingensis* n. sp.**

The shell is somewhat biconic, with short, straightly conic spire and weakly angular periphery. Suture bordered below with an irregular, somewhat scabrous rounded ridge or welt; a somewhat nodose low rounded ridge runs in the anterior concavity. Sculpture of numerous vertical ribs on the upper and middle part of the whorls, strongest at the periphery, ten on the last whorl, and many spiral cords in strong relief. Siphonal fasciole prominent, umbilical crevice open. The aperture has a shallow posterior channel and the usual deep anterior notch. Columella is heavy rounded and straight.

Length 45, diam. 30 mm.;  $5\frac{1}{2}$  whorls.

Type No. 3187, A. N. S. P.

This species may be compared with the recent Caribbean *Thais coronata* (Lam.). It differs in sculpture, having rounded ribs in the peripheral region, where it is indistinctly angular. In *T. coronata* the later whorls are distinctly shouldered. There is a spiral ridge in the concavity below, which is wanting in *T. coronata*.

***Malea elliptica* n. sp.**

The shell is narrower than *M. camura*, with a longer spire. Sculpture of flattened, very slightly raised, strap-like spirals, which are

much wider than the intervals. Three spirals below the suture are narrow. On the penult whorl there are five subequal wide spirals besides three subsutural narrow ones, the intervals traversed by fine threads. The last whorl has twenty wide and three narrow spirals. The aperture is narrow. Lip having about the same structure as in *M. camura*. There is a large parietal tooth, with smaller ones above and below it, and a prominent, double, columellar tooth; the columella and the upper part of the parietal wall strongly rugose.

Length 53.5, diam. 34.7 mm.;  $5\frac{3}{4}$  whorls remaining, the tip wanting.  
Type No. 2590.

The very much less raised and more numerous spirals, as well as the general shape of the shell, separate this from *M. camura*.

***Malea goliath* n. sp.**

Large and globose, thin, with sculpture of broad, flat spirals parted by furrows from one-fourth to one-third as wide, 19 spirals on the last whorl, five on the penult and next earlier, where the median one is larger and prominent. Parietal tooth composed of four plaits. Columellar prominence with about six plaits, the upper three larger. Outer lip broken, but fragments indicate structure similar to *M. camura*.

Length 129, diam. 107 mm.  
Type No. 2592.

***Strombus galliformis* n. sp.**

*Strombus bituberculatus* Lam., in part, Gabb, Tr. Am. Philos. Soc., XV, 1873, p. 233. Not of Lamarck.

Related to *S. gallus* L. The spire is high, with sculpture of axial riblets and inconspicuous varices on the earlier whorls, changing to short tubercles on the last four, the penult whorl having two low, massive varices. Whorls of the spire having unequal spiral striæ. The last whorl has a smooth shoulder in front, three high tubercles on the back, the central one largest; the whole surface having widely spaced spiral ridges and fine, very weak, spiral striæ. Lip produced upward in an angle, smooth within; no entering wrinkles on the posterior end of columellar lip.

Length 100, diam. 66 mm.;  $9\frac{1}{2}$  whorls.

In the recent *S. gallus* the lip is far more produced upward and it spreads on the left side above the shoulder; the spiral ridges on the back are coarser, and the tubercles at the shoulder more numerous. The new form is more like *S. peruvianus* in form of the lip, but that species has the throat conspicuously rugose.

Type is No. 2582, A. N. S. P.

**Strombus dominator** n. sp.

*Strombus gigas* Linn., Gabb, Tr. Am. Philos. Soc., XV, p. 234.

A species related to *S. costatus* (*accipitrinus*). Spire not very high, the whorls having rounded tubercles on the periphery, and spiral striæ. The last whorl has a strong, rounded keel at the shoulder, a stout, triangular tubercle in the middle of the back, preceded by another on the side. There is an inferior series of small tubercles, and on the latter part of the whorl, some low, coarse spiral ridges. The lip spreads broadly and is much thickened within. *Posteriorly it extends above the apex.* The throat is smooth.

Length 88, diam. 75 mm. Length of aperture (measured from end of canal to upper end of the lip) 97 mm.

The type is an almost perfect but dwarf specimen. Several fragmentary specimens are much larger, the best one about 15 cm. long. The outer lip of another indicates a length of perhaps 20 cm. It was apparently the mere size, rather than any close correspondence of form or sculpture, which determined Gabb's reference of the form to *S. gigas*.

It is related to *S. costatus* and *S. goliath*, the spire being much like the latter, which however, has the outer lip far more broadly expanding, and the upper margin quite different. In *S. costatus* the lip falls short of the height of the spire, but in *S. dominator* it rises above the apex.

Type No. 2579.

**Potamides gastrodon** n. sp.

The shell is rather short, conic, the whorls closely and regularly sculptured with axial riblets crossed by three spiral cords, forming small tubercles at the intersections. There are a few inconspicuous varices. Last whorl rises at the aperture, and has a prominent, rounded varix on the left side; the cavity of the whorl at this place having three well developed and a minute fourth tooth within the outer wall, a fold on the parietal wall near the posterior angle, and a plait on the columella. Last half of the last whorl is broken away. As broken, the type measures:

Length 22.5, diam. 11 mm.

The type and three other broken specimens are No. 2599, A. N. S. P.

**Turritella suloigyrata** n. sp.

*Turritella planigyrate* Guppy, Gabb, Tr. Am. Philos. Soc., XV, 1873, p. 240.  
Not of Guppy.

This species is closely related to *T. gatunensis* Conrad, but differs by being constantly less excavated along the suture, though there is a

rather deep sutural channel. This leaves a broad median band in strong relief on the whorls, which have spiral sculpture of spiral cords and threads. The inconspicuous growth-lines arch backward.

Length 54, diam. 13.8 mm.; 14 whorls. The specimen has lost the last whorl.

Type No. 3203, A. N. S. P.

We have not been able to compare the type of Guppy's *T. planigyrata*, but his description and figure certainly do not support Gabb's identification. Guppy has remarked, however, that his figure of *T. planigyrata* "shows only the general shape."

*T. sulcigyrata* is an abundant species.

*Turritella arata* Guppy, in Proc. U. S. Nat. Mus., XIX, p. 319, Pl. 28, fig. 3 from the Oligocene of Haiti, is not contained in the collections studied.

**Cæcum anellifer** n. n.

*Cæcum annulatum* Gabb, Trans. Am. Philos. Soc., XV, p. 241; Journ. A. N. S. Phila., VIII, p. 363, Pl. 46, fig. 59. Not of Brown.

The single specimen is not mature, but it may be recognized by the sculpture. There are about 25 convex rings, more emphatic posteriorly, lower anteriorly, their intervals much narrower than the ribs, crossed and cut into pits by numerous low axial ribs, which appear very weakly on the rings. Septum rises in a point near the convex side.

Length 1.95, diam. 0.6 mm.

The rings of *C. crasscostum* Gabb are very much stronger, the intervals wider, so that, with a single example of each at hand, it does not seem prudent to unite them as one species.

**Rissoa epulata** n. sp.

The shell is globose-conic and has a relatively large circular umbilicus; spire short, straightly conic, of moderately convex whorls, the last whorl inflated. Sculpture of rounded vertical ribs about equal to their intervals, 17 on the last whorl, diminishing and soon disappearing after passing over the periphery. In the intercostal intervals there are very low spiral cords, six above the periphery, and the base has four much stronger and more separated cords. A broad and thick varix strengthens the outer lip. The aperture is roundly ovate; peristome continuous.

Length 1.25, diam. 0.9 mm.;  $4\frac{3}{4}$  whorls.

Type No. 3167, A. N. S. P.

The short form and large umbilicus are the chief characteristics

of this species. Belongs to the section *Apicularia* of Tryon's arrangement.

**Rissoa (Alvania) proavia** n. sp.

The shell is imperforate, rather plump, conic; first  $2\frac{1}{3}$  whorls are smooth, convex, and form a somewhat acuminate summit. Following whorls have latticed sculpture of rather narrow vertical ribs, which pass over the periphery but are obsolete over most of the base, crossed by spiral cords a little narrower than the ribs, and forming small nodes at the intersections. On the penult whorl there are three spiral cords, the upper one at the shoulder. On the last whorl there are six spiral cords, the second from above forming the periphery, the lower two smooth, the others passing over ribs. Some very minute spiral striæ are visible in the intercostal spaces. The aperture is nearly circular, the lip strengthened by a strong varix.

Length 1.35, diam. 0.9 mm.; 5 whorls.

Type No. 3169, A. N. S. P.

This species stands close to *Rissoa lipeus* Dall,<sup>2</sup> but it differs by the acute apex and details of sculpture.

**Hipponix otiosa** n. sp.

The shell is oval, obliquely conic, with the apex curving backward nearly over the posterior margin. The apical portion sits cap-like at the summit, and is probably smooth, though somewhat worn, the original surface being mostly removed. The later growth is rudely ribbed radially with 14 ribs in a young specimen 5 mm. long, 18 in the largest specimen, about 9.3 mm. long. The ribs are wide, sculptured with rather rough growth-lines, and near the periphery with coarse radial striæ. The border is scalloped by the ribs.

Length about 9.3, width 8, height 5.5 mm.

Type and two other specimens are No. 2887, A. N. S. P.

**Natica finitima** n. sp.

The shell resembles *N. canrena* in shape. The narrow and short spire is rather acute, of 5 convex whorls. The suture is very narrowly channelled; last whorl very convex throughout. Umbilicus is formed as in *canrena* except that the spiral pillar is decidedly smaller and terminates in a much smaller columellar callus. Parietal callus is heavy. The surface shows light growth-lines, some of which are slightly stronger below the suture, but far less so than in *N. canrena*.

Alt. 23.5, diam. 24 mm. (type).

" 23.5, " 26.2 " (largest specimen).

---

<sup>2</sup> *Trans. Wagn. Inst.*, III, p. 339, Pl. 20, fig. 8b. Pliocene of the Caloosahatchie, also recent, Watling Island, Bahamas.

This species is easily to be distinguished from *N. canrena* by the noticeably channelled suture, absence of subsutural plication, and the characters of the umbilicus. Gabb grouped them with the specimens of *N. canrena*.

The type and seven other specimens are No. 2875, A. N. S. P.

**Aolis (Amblyspira) bartochiana** n. sp.

The shell is long and slender, smooth. Nuclear whorls lost; the following whorls are slightly concave, the suture prominent as a sharp, low ridge; the penult whorl has an angle projecting inconspicuously just above the suture, last whorl is sharply angular in front, the angle entirely disappearing on its last half. The aperture is small, ovate, diagonal. Peristome continuous across the parietal wall, the columella somewhat thickened, simple.

Length 3.6, diam. 0.95, length of aperture 0.75 mm.; 10 post-nuclear whorls.

Type No. 3016, A. N. S. P.

A characteristic little shell, named for Dr. Paul Bartch, whose industry and acumen in the classification of *Pyramidellidæ* are bringing order into this once chaotic group.

**Pyramidella forulata famelica** n. subsp.

The shell closely resembles *P. canaliculata*, but differs by its narrower contour, smaller sutural channel and by having faint traces of spiral striation. Last whorl has a small peripheral carina, but only the weak trace of a furrow below it. There is fine crenulation below the suture and a narrow umbilicus bounded by a cord-like fasciole.

Length 10.5, diam. 3 mm.; 13 whorls (apex entire).

The shell is somewhat narrower than the Bowden form which we take to be the adult stage of *P. forulata* Guppy,<sup>3</sup> yet a thorough comparison of good series may show that there are transitions. The type of *forulata* is, we believe, a quite young shell.

**Turbonilla (Pyrgiscus) beatula** n. sp.

Shell rather rapidly tapering, the whorls slightly prominent and convex below the suture, elsewhere nearly flat, with sculpture of vertical, rounded ribs about equal to the intervals, and extending from suture to suture. Intervals minutely striate vertically, the striæ cut by incised spiral lines, of which there are eight on the penult whorl. A few similar spirals may be seen on the otherwise

<sup>3</sup> *Pyramidella forulata* Guppy, in Dall, *Proc. U. S. N. Mus.*, XIX, p. 315, Pl. 28, fig. 13.

smooth base. There are nineteen ribs on the penult whorl. Aperture somewhat trapezoidal, the columella slightly sinuous, thickened.

Length 3.8, diam. 1, length of aperture 0.75 mm.; 8 post-embryonic whorls.

Type No. 3026, A. N. S. P.

**Turbonilla** (*Pyrgiscus*) *santodomingensis* n. sp.

The shell tapers very slowly. Nuclear and early neanic whorls wanting. The rest have rather strong, rounded, straight vertical ribs, which become slightly retractive on the last two whorls, and part of them continue very weakly over the base. There are 17 ribs on the penult whorl. There are five (5) spiral impressed lines between sutures, not crossing the summits of the ribs. On the base there are about 6 spiral impressed lines, the lower three continuous. The aperture is especially short; columella very strongly folded and thickened.

Length 6.4, diam. 1.35 mm.;  $10\frac{1}{2}$  whorls remaining.

Type No. 3034, A. N. S. P.

Longer, more slender than *T. dominicensis*, with fewer ribs and fewer spirals which are more deeply impressed. It differs more fundamentally by the very strong columellar fold.

**Turbonilla** (*Chemnitzia*) *galeata* n. sp.

The shell is very slender, with a large helicoid nucleus; next whorl sculptured with numerous ribs, subsequent whorls with fewer vertical rounded ribs running from suture to suture, nearly as wide as the concave intervals, which under a high power show a faint woven texture. Sixteen ribs are on the penult whorl. On the last whorl there is an inconspicuous spiral depression at the anterior termination of the ribs. The base has some faint spiral impressed lines. The aperture is ovate; columella somewhat thickened, distinctly folded above.

Length 2.9, diam. 0.55, length of aperture 0.4 mm.;  $7\frac{1}{2}$  post-nuclear whorls.

Type No. 3028, A. N. S. P.

**Turbonilla** (*Chemnitzia*) *peraequa* n. sp.

Embryonic whorls helicoid. Subsequent whorls with sculpture of numerous rounded vertical ribs equal to the concave intervals, both ribs becoming weaker and terminating a little distance short of the lower suture; the concave intervals also terminating there, but rather abruptly. There are 22 ribs on the penult whorl. Base smooth.

The aperture is ovate, columella very little thickened, somewhat sinuous.

Length 2.6, diam. 0.65, length of aperture 0.6 mm.;  $6\frac{2}{3}$  post-embryonic whorls.

Type No. 3027, A. N. S. P.

The spire of the nuclear shell is rather high for a snail of this section.

**Turbonilla (Nisiturris ?) angustula** n. n.

*Turbonilla angusta* Gabb, Trans. Am. Philos. Soc., XV, 1873, p. 225. Not *Chrysallida angusta* Cpr. 1864.

The embryonic whorls are lost, with one or more of the neanic. Subsequent whorls have straight, rounded, slightly protractive ribs, which do not reach to the lower suture, the lower ends of the concave intervals abruptly limited but rounded, and showing very faint traces of spiral striæ, in part obsolete. On the penult whorl there are 18 ribs. The rounded base has growth-lines and faint spiral lines. The upper whorls are convex, later ones flattened, the suture rather deeply impressed. The columella is very feebly sinuous, somewhat thickened.

Length 5.7, diam. 1.35 mm.; 10 whorls remaining.

Type No. 3025, A. N. S. P.

Gabb's name has been previously used in the subgenus *Pyrgiscus*. His statement that the shell is "without any trace of spiral lines" is inexact, since faint spirals may be seen under the compound microscope, though not visible with an ordinary hand lens.

**Turbonilla (Nisiturris) aratibacillum** n. sp.

The shell is small and more slender than *T. angustula*, with sculpture of rounded, vertical ribs extending barely to the lower suture of each whorl and the periphery of the last, the lower ends of the smooth intervals not sharply defined. There are 13 ribs on the penult whorl. Base smooth. Columella straight, with dilated edge.

Length 3.3, diam. 0.75 mm.; 9 post-embryonic whorls.

Type No. 3036, A. N. S. P.

The embryonic shell is not perfect, but seems to have been of the bulimoid form. The shell is less slender than *T. pertenuis*.

**Turbonilla (Nisiturris) insititia** n. sp.

The shell is extremely slender, with embryonic shell of bulimoid shape; subsequent whorls at first convex, becoming flattened in the lower part, sculptured with strong, rounded vertical ribs not quite

as wide as the smooth concave interval which do not quite extend to the suture below, and terminate abruptly at the periphery. There are ten ribs on the penult whorl. Base smooth. The aperture is trapezoidal; columella very slightly sinuous.

Length 2.8, diam. 0.5, length of aperture 0.4 mm.;  $9\frac{1}{2}$  post-nuclear whorls.

Type No. 3024, A. N. S. P.

This is the most slender of the known Santo Domingan species, further distinguished by its few coarse ribs.

**Turbonilla (Nisiturris) undecimcostata** n. sp.

The shell is slender with bulimoid nucleus; subsequent whorls convex, sculptured with narrow, straight vertical ribs separated by concave intervals about twice as wide as the ribs, and under strong magnification showing extremely fine and faint vertical and spiral striæ. The concave intervals terminate rather abruptly just above the suture and at the periphery. On the penult whorl there are eleven ribs. The aperture is subtrapezoidal. Columella thick and very slightly sinuous.

Length 3.3, diam. 0.7, length of aperture 0.5 mm.;  $9\frac{1}{2}$  post-nuclear whorls.

Type No. 3023, A. N. S. P.

**Turbonilla (Nisiturris) pertenuis** Gabb.

*Turbonilla pertenuis* Gabb, Trans. Am. Philos. Soc., XV, 1873, p. 226.

An extremely slender species. Nuclear shell bulimoid; subsequent whorls at first rather strongly convex gradually becoming less convex, the lower ones somewhat flattened laterally, with sculpture of strong, rounded vertical ribs parted by slightly wider, smooth, concave intervals, the rounded lower ends of which are a little above the lower suture, leaving a very narrow smooth band on each whorl. There are twelve ribs on the penult whorl. Base smooth, convex, the columella is thin and slightly sinuous.

Length 4, diam. 0.7, length of aperture 0.6 mm.; 11 post-nuclear whorls.

Type No. 3030, A. N. S. P.

**Turbonilla (Nisiturris) contexta** n. sp.

The shell is very slender with bulimoid embryo; subsequent whorls convex at first, the later ones distinctly flattened, sculptured with vertical rounded ribs, 15 on the penult whorl, slightly narrower than the concave intervals, and extending from suture to suture. Under the compound microscope the intervals are seen to have a minute

sculpture of vertical striæ cut into beads by close spiral-lines. On the last whorl the ribs and intervals do not end abruptly. The base has weak spiral impressed lines. The aperture is rhombic; columella thin and very slightly sinuous.

Length 3.7, diam. 0.75, length of aperture 0.6 mm.; 9 post-nuclear whorls.

Type No. 3035, A. N. S. P.

The microscopic sculpture is a distinctive feature of this species.

**Turbonilla (Tragula) egressa** n. sp.

The shell is slender, with a depressed-helicoid nuclear shell, fully half immersed. Following whorls are subangular and overhang the suture, and are flattened above the angle. Sculpture of rounded vertical riblets as wide as their intervals on the first two whorls, but gradually becoming more spaced, so that on the last 3 whorls the intervals are wider. First three post-nuclear whorls have in the intercostal intervals a single rounded cord on the angle, another very weak one below the upper suture. On the next two whorls there is an additional cord above the angle, another just above the suture, and the subsutural cord is obsolete. Last whorl has the vertical ribs extending nearly to the axis, the intervals crossed by a spiral cord at, another above the periphery, and two strong cords on the base, followed by about four faint ones, very low and difficult to see. The aperture is ovate; columella thin, straight above, but showing a small, sharp, oblique plait in an obliquely basal view.

Length 2.5, diam. 0.75, length of aperture 0.65 mm.;  $6\frac{1}{2}$  post-nuclear whorls.

Type No. 3095.

**Odostomia (Odostomia) ingloria** n. sp.

Shell oblong-conic with obtuse summit, the first whorl convex, turned down at the tip; following whorls flat, with the suture rather deeply impressed. Last whorl rounded peripherally, narrowly rimate. Aperture ovate; columella a little thickened, bearing a small oblique plait. Surface plain.

Length 2.05, diam. 1 mm.; 5 whorls.

Type No. 3087, A. N. S. P.

An allied form, which may be called *O. ingloria calvata* differs by its shorter whorls, the last one noticeably subangular in front. Length 2.5, diam. 1.05 mm.; slightly over 6 whorls.

Type No. 3088, A. N. S. P.

***Odostomia santodomingensis* n. n.**

*Aclis polita* Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 226. Not *Odostomia polita* of Bivona or of Pease.

The form is somewhat cylindric. The surface is marked with very fine growth-lines only. Whorls are weakly convex except the first which is rather strongly so. The suture is channelled, the whorl being excavated above it, narrowly horizontal and carinate close below. There is a very slight median prominence of the columella, hardly noticeable. The tip of the spire is turned in, nucleus immersed. The aperture is rather oblique.

Length 2.6, diam. 0.9 mm.; 6 whorls.

Type No. 3084, A. N. S. P.

This species and the following one scarcely agree with the characters of *Spiroclimax*, and the channelled suture appears to remove them from typical *Odostomia*. They seem to form a new subgenus of *Odostomia*. As Doctor Bartsch has a general work on east American *Pyramidellidae* under way, we prefer to leave the final classification in his able hands.

A second specimen is more solid than the figured type but otherwise similar.

***Odostomia myrmecoon* n. sp.**

The shell is structurally very similar to *O. santodomingensis*, from which it differs by the shorter, more obese outline and the slightly sinuous columella.

Length 2.25, diam. 1 mm.;  $5\frac{1}{2}$  whorls.

Type No. 3085, A. N. S. P.

***Odostomia* (*Eulimastoma*) *pyrgulepsis* n. sp.**

The shell is openly perforate, long-conic, solid, marked with faint growth-lines only. (Nuclear whorls presumably immersed), the first rounded above, turned in at the tip; following whorls flat, separated by a narrowly channelled suture, caused by the revolution of the suture just below a peripheral angle; on the last two whorls the suture descends more, leaving the peripheral angle, projecting prominently. It weakens on the latter part of the last whorl. The margin of the umbilical opening is rounded. Aperture is ovate. Columella thin, concave, having a small, obliquely receding plait above.

Length 1.8, diam. 0.7 mm.;  $6\frac{1}{2}$  whorls.

Type No. 3092, A. N. S. P.

There is considerable variation in the degree of descent of the last two whorls, and the point where the more rapid descent begins.

In some shells the penult whorl does not descend more rapidly than those preceding it. This gives the shell a contour somewhat different.

This little shell resembles *Pyrgulopsis* in shape. It also has much in common with *Aclis* (*Amblyspira*) *prominens* Guppy of the Bowden bed, but we can find no columellar plait in that species, which moreover is decidedly larger.

**Odostomia** (**Eulimastoma**) **bathyraphe** n. sp.

The shell resembles *O. pyrgulopsis* in umbilicus, surface and general appearance, but differs as follows: The last whorl is more strongly carinate; the whole shell is wider, summit more obtuse, whorls less numerous. The tip of the first whorl is turned in, nuclear whorls being presumably wholly immersed. The suture is deeply channelled from its beginning.

Length 1.5, diam. 0.8 mm.;  $4\frac{1}{2}$  whorls.

Type No. 3091, A. N. S. P.

As in *O. pyrgulopsis*, the columellar plait appears much larger in an oblique view than in the face view drawn in the figures.

**Odostomia** (**Evalea**?) **vexator** n. sp.

The shell is somewhat cylindric but tapers slowly upwards to a very obtuse summit, which turns in at the tip, the nuclear whorls being immersed. Subsequent whorls are flattened, excavated above the suture, very narrowly shouldered below it, with sculpture of fine lines of growth and numerous (about 15 on the penult whorl) unequally spaced, very low and relatively coarse spiral striæ. The aperture is somewhat rhombic; columella thin, with a strong, short plait.

Length 1.9, diam. 0.6 mm.;  $5\frac{1}{2}$  whorls.

Type No. 3086, A. N. S. P.

By Doctor Bartsch's key we bring this species into the subgenus *Evalea*. The deeply excavated suture and somewhat coarser spiral sculpture are differential characters, the suture, summit and general shape of the shell agreeing with *O. santodomingensis*. We are therefore in doubt as to its subgeneric place. The columellar plait shows fully only in a somewhat oblique view, as it recedes somewhat.

Besides the type and a broken specimen, there is a larger shell, length 2.2, diam. 0.75 mm., otherwise similar.

**Odostomia** (**Goniodostomia**) **superans** n. sp.

The shell is imperforate, oblong-conic, terminating in a very obtuse summit. Embryonic whorls immersed. First visible whorl is strongly convex, its initial part ascending. Following whorls are

flat, separated by a channelled suture, angular above and below it, the lower angle becoming more prominent on the penult whorl, forming a keel which continues at the periphery of the last whorl, which is rather strongly concave above it, and slightly so below. The surface is marked with faint growth-lines and many unequal spiral striæ. The aperture is ovate, somewhat oblique; columella thick, bearing a stout oblique plait above.

Length 1.85, diam. 0.9, length of aperture 0.6 mm.; very nearly 5 whorls.

Type No. 3096, A. N. S. P.

This species is related to *O. circumvineta*, but is wider, with a stronger peripheral carina, a stronger columellar plait, and not so many whorls.

The spiral sculpture is indicated rather than drawn in the figures of this species and the next. The spiral striæ are very low, rounded, unequal and unevenly spaced, but somewhat coarse and barely visible with a good hand lens.

As it cannot readily be fitted into any of the sections of *Odostomia*, we propose the new section *Goniodostomia*, for *Odostomias* without axial ribs, having a peripheral keel and spiral striation, the columellar plait emerging, nucleus wholly immersed. Type *O. superans*.

***Odostomia (Goniodostomia) circumvineta* n. sp.**

The shell is rimate, slowly tapering to the obtuse summit, the embryonic whorls immersed, first visible whorl convex, turned in at the tip; subsequent whorls flat, narrowly excavated above and narrowly shouldered below the suture, which is therefore deeply channelled; last whorl angular or subcarinate at the periphery. Sculpture of faint growth-lines and rather sparse unequal, low, spiral striæ. Aperture ovate; columella thin, bearing a short fold above.

Length 1.75, diam. 0.65, aperture 0.5 mm.;  $5\frac{3}{4}$  whorls.

Type No. 3097, A. N. S. P.

Somewhat like *O. vexator*, but the suture is decidedly more channelled and the last whorl is carinate. In shape but not in sculpture it resembles the subgenus *Eulimastoma*. It is more slender than *O. superans*.

***Odostomia (Parthenina ?) cyclocephala* n. sp.**

Shell lanceolate, thin, with a large helicoid nucleus of  $1\frac{1}{2}$  whorls; subsequent whorls sculptured with small vertical ribs narrower than their intervals, becoming obsolete at the periphery; over ribs and intervals there are delicately engraved spiral lines, of which 17 may

be counted on the penult whorl. The whole base is closely, **finely** striate spirally. Aperture is long-ovate, acute above, the columella with a small but distinct fold.

Length 2.6, diam. 0.6 mm.;  $5\frac{1}{2}$  post-nuclear whorls.

Type No. 3033, A. N. S. P.

This species has a spirally striate base, as in the subgenus *Besla* of Dall & Bartsch, but it has not the special sculpture above the periphery described for the species of that group.

**Odostomia (Odostomidea) bartschiana** n. sp.

The shell is oblong, with a rounded nucleus more than half immersed. Subsequent whorls have few strong ribs, about 13 on the first post-nuclear whorl, not so many on the next, where they are slightly protractive; eight vertical ribs on the last whorl. Intercoastal spaces very wide, concave, showing most minute spiral striæ in some places. Suture somewhat sinuated by the ribs. The ovate aperture has a continuous peristome, the columella bearing a strong central plait.

Length 2, diam. 0.7 mm.;  $4\frac{1}{2}$  post-nuclear whorls.

Type No. 3032, A. N. S. P.

The very small number of ribs with wide intervals appears to indicate a section of subgenus distinct from *Odostomella* B. D. & D., which may be called *Odostomidea*.

**Odostomia (Chrysallida) duleis** n. sp.

*Menestho clathrata* Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 226. Not *Odostomia clathrata* Jeffreys, Ann. Mag. N. H. II, 1848, p. 345.

The nucleus is more than half immersed. Subsequent whorls are convex, with a deeply impressed suture. Sculpture of numerous rounded vertical ribs equal to their intervals, gradually fading out at the periphery of the last whorl. These ribs are crossed by six slightly smaller spiral cords between sutures; the intersections are not noticeably nodose. On the base there are seven cords, and there they are broader and more crowded, their intervals narrow. The aperture is long-ovate. Columella concave and a little thickened below, passing into a moderate fold above.

Length 2.9, diam. 1, length of aperture 1 mm.; 5 post-nuclear whorls.

**Melanella astuta** n. n.

*Eulima robusta* Gabb, Trans. Am. Philos. Soc., XV, 1873, p. 227. Not of A. Adams, 1861.

The shell is very slightly curved, smooth and glossy, the whorls nearly flat, rather short, showing a bluish-gray band above the

middle; suture distinct, but slightly oblique. Aperture short, piriform, the columella strongly thickened.

Length 4.2, diam. 1.2, length of aperture 1.1 mm.; 12 whorls.

Type No. 3009, A. N. S. P.

**Melanella gabbiana** n. sp.

The shell is straight, smooth and glossy, of barely convex whorls, the suture rather indistinct. There is an impressed protractive groove on the penult whorl, left by a former peristome. Aperture narrowly ovate. Outer lip sinuous, protractive. Columella strongly thickened.

Length 4.2, diam. 1.25, length of aperture 1.2 mm.; 11 whorls.

Type No. 3012, A. N. S. P.

Though of nearly the same dimensions as *M. astuta*, this species differs in shape.

**Strombiformis sarissiformis** n. n.

*Eulima acicularis* Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 227. Not of A. Adams, 1861.

The shell is slender, the diameter contained about 5 times in the length. Whorls of the spire nearly flat, smooth except for several unequally spaced growth-arrest marks on each. Aperture very narrow, lanceolate. Columella thickened. The tip of the spire and the outer lip are broken.

Length 12, diam. 2.2, length of aperture 3.3 mm.; 12 whorls.

Type No. 3010, A. N. S. P.

**Strombiformis praelubrica** n. sp.

Very slender, the diameter contained about  $4\frac{2}{3}$  times in the length, whorls hardly convex, very smooth, but showing faintly a few marks of growth-arrest. Aperture narrow, lanceolate, acuminate above. Outer lip receding slightly downward. Columella rather strongly thickened.

Length 5.1, diam. 1.1, length of aperture 1.4 mm.; 11 whorls.

Type No. 3011, A. N. S. P.

**Strombiformis ischnon** n. sp.

The shell is very similar to *M. praelubrica*, but differs by its more slender shape, the diameter contained five times in the length. The aperture is narrower, and the columella more thickened.

Length 4.1, diam. 0.8, length of aperture 1.1 mm.; 10 whorls.

Type No. 3013, A. N. S. P.

**Strombiformis (Subularia) stimulus** n. sp.

The shell is minute, acuminate, showing very delicate, forwardly

arched growth-lines and several slightly impressed lines of growth-arrest. Whorls moderately convex. Suture distinctly impressed, oblique. Aperture lanceolate, the columella a little thickened and straightened.

Length 1.6, diam. 0.6, length of aperture 0.6 mm.; 7 whorls.

Type No. 3093, A. N. S. P.

The shell is pale gray with a rather wide opaque white band below the suture. Probably belongs to the genus or subgenus *Subularia*. The lines of growth-arrest are all sublateral.

***Astræa domingensis* n. sp.**

*Astralium longispinum* Lam., Gabb, Tr. Amer. Philos. Soc., XV, p. 242.

A species resembling *A. americana* in shape. The flat whorls have sculpture of numerous (about 9) low spiral cords, and extremely numerous, fine and low, protractive riblets. At the periphery there are slender, straight spines projecting above the suture, about 10 on the last whorl. Height and diameter about 16 mm. as preserved.

Type No. 2827, A. N. S. P.

The specimen is an external mould of the spire, or part of it, in a hard rock. It differs so conspicuously from *A. longispina* that we are surprised at Gabb's identification. The spines, on the next to the last whorl preserved, are slightly over 2 mm. long. It appears to be somewhat related to *Astralium chipolanum* Dall.

***Circulus domingensis* n. n.**

*Cyclostrema striata* Gabb, Tr. Amer. Philos. Soc., XV, 1873, p. 242. Not *Circulus striatus* Phil.

Eight spiral threads may be counted on the penult whorl just behind the aperture, seven on the next earlier whorl. On the last whorl the cords become widely separated by flat intervals on the upper surface, are weak and inconspicuous at and a short distance above the periphery, but remain strong and regular on the base.

Alt. 2.25, diam. 4.8 mm.

Though larger than the recent species of *Circulus*, with the spire a little more raised, we can find no differences of generic importance.

Type No. 2835.

***Discopsis* (?) *naso* n. n.**

*Adeorbis carinata* Gabb, Tr. Amer. Philos. Soc., XV, 1873, p. 243. Not *A. carinata* A. Ad., 1863.

The first two whorls are convex above; the third is flattened below the suture, the flat area bounded by an angle, and a second, less conspicuous spiral angulation runs above the periphery. The penult whorl is rounded, but shows the top of the peripheral carina

in the suture. Last whorl is convex above and below the acutely carinate periphery, and a carina also bounds the umbilicus. The peripheral carina has numerous little prominences, inconspicuous and regularly spaced. On the base there are unequal radial wrinkles around the umbilicus. The aperture is somewhat oblique and the peristome projects forward in a point at the periphery.

Alt. 2.7, diam. 4.5 mm.; diam. of umbilicus 0.9 mm.; 5 whorls.

The generic place of this species is doubtful.

Type No. 2832.

**Dentalium sagittarii** n. sp.

The shell is smooth, almost circular in section, but slightly flattened between concave and convex sides, rather strongly and evenly bent, very slowly increasing in size, the greatest diameter contained about twelve times in the length. Not sculptured, but very oblique growth-lines are discernable.

Length 13, greatest (lateral) diameter 1.1, antero-posterior diameter 1 mm.

This species is more arched than *D. macilentum*, which is compressed from side to side. *D. schumoi* differs by its close annulation.

**Leda extricata** n. n.

*Leda acuta* Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 255. Not of Conrad, 1832.

The shell is rather plump with nearly median beaks and acuminate posterior end, polished, strongly and closely sculptured with even, blunt-edged concentric riblets, equal to their smooth intervals. On the rather large escutcheon, which is indistinctly defined by a slight furrow, the riblets are a little sinuous, slightly emphasized at the sinuation, close and straight near the hinge-line. The lanceolate lunule has a series of short, oblique folds, stronger and more spaced than the adjacent riblets. Rostrum acute, slightly recurved.

Hinge with long and acute V-shaped teeth, 15 in the anterior, about 20 in the posterior series.

Length 8.7, alt. 5, diam. 4 mm.

Type No. 2655, A. N. S. P.

This abundant species is longer than *L. peltella* Dall,<sup>4</sup> with a longer rostrum and quite different lunule and escutcheon.

*Leda peltella* was based upon (1) the figure of a specimen from Bowden, and (2) *L. acuta* Gabb not Conrad. As the figure is a more concrete indication than the second reference, we restrict *L. peltella*

---

<sup>4</sup> Trans. Wagn. Inst., III, p. 579, Pl. 32, fig. 5.

to the Bowden shell. Gabb's *L. acuta* is certainly a distinct species, as we have ascertained by the examination of over a hundred examples of each.

It is related to *L. dodona* Dall, which differs in several details of form and sculpture.

**Arca (Scapharca) sobrina** n. n.

*Arca consobrina* Sowerby, Q. Jour. Geol. Soc., VI, 1849, p. 52, Pl. X, fig.

12. Not *A. consobrina* Orbigny, 1843, or of Guppy.

*A. (Anadara) consobrina* Sby., Gabb, Trans. Amer. Philos. Soc., XV, p. 253.

The shell is nearly equivalve, oblong, strongly inflated, tapering posteriorly, the anterior end somewhat oblique. Beaks moderate, mesially impressed, situated at about the anterior fourth of the length. The cardinal area is rather narrow, marked by several concentric grooves. The left valve is slightly larger, with sculpture of 33 rather high ribs with abrupt sides. Except on the posterior dorsal slope the ribs are closely sculptured with transverse granules, which are continued as thin raised striæ over the intervals. The anterior and posterior ribs are divided by a groove along the summits. The right valve is similar, but the granules on the ribs are almost obsolete. The hinge has 29 teeth in front, 40 behind, the row being continuous except for a small irregularity. Border very deeply crenated.

Length 50, alt. 30, diam. 29 mm.

" 48, " 30, " of right valve, 14 mm.

Cotypes No. 2737, A. N. S. P.

*Arca actinophora* Dall has more ribs, is narrower posteriorly, and differs in proportions. *A. sobrina* is not very closely related to *A. halidonata* Dall of the Jamaican (Bowden) Oligocene, which we have not found in the Santo Domingan collection. It is very much like *A. dariensis* Brn. & Pils., but the valves are more convex and the details of rib sculpture differ. It also is a larger species.

**Arca (Scapharca) copiosa** n. sp.

The shell is oblong, somewhat trapezoidal, strongly inflated. Left valve slightly larger. Beaks impressed in the middle, in front of the anterior fourth. Cardinal area moderately wide, marked with about 4 grooves on the anterior, 5 or 6 on the posterior part. Sculpture of 30 ribs, in the left valve about equal to the deep intervals; at the anterior end the ribs have flat, or somewhat concave summits. Both ribs and interstices are crossed by fine, close concentric threads, which give place to mere growth-lines on the posterior area, where the ribs weaken. The right valve is like the left except that the

concentric threads are not quite so well developed. Tooth-row continuous, but an enlarged tooth separates the anterior series of 30 teeth from the posterior series of 36; the length of the two being as 3 : 4, or as 2 : 3. Margins are deeply fluted, as usual.

Length 60, alt. 37, diam. 36.5 mm.

Type No. 2731, A. N. S. P.

This shell is related to *A. halidonata*, but it is much narrower, the ribs are not grooved and not so numerous, the beaks are smaller, the cardinal area has more grooves, etc. In *A. antiquata* L. the beaks are turned forward less, the anterior angle is more produced, and the cardinal area has fewer grooves. Both *A. halidonata* and *A. antiquata* have impressed lines or grooves along the posterior ribs, in large examples, which are wanting in *A. copiosa*.

**Area (Scapharoea) deveza** n. sp.

The shell is somewhat trapezoidal, much inflated, with wide, moderately prominent beaks which are widely separated by a rather wide, flat cardinal area. Anterior and posterior ends oblique, roughly parallel, the anterior convex, posterior somewhat straightened; basal margin strongly convex. Sculpture of 26 square ribs somewhat narrower than their intervals, unevenly granose, the granules transverse, subobsolete in places, and on the posterior ribs weaker on the right valve, some of the anterior ribs are bifid in the left valve. Intervals sharply striated transversely. The cardinal area has many regular grooves over the whole posterior part, but anteriorly only the central part is grooved, the sides being smooth. The anterior end of the hinge line is strongly angular. Tooth-row continuous.

Length 42, alt. 30, diam. 31 mm.

Type No. 2727, A. N. S. P. Valves of 5 other individuals.

This species has a characteristic form. The close, regular grooves of the cardinal area, which has smooth sides anteriorly, is also notable.

**Area (Scapharoea) intumescens** n. sp.

The shell is somewhat trapezoidal, inflated, with mesially impressed, beaks slightly before the anterior fourth. Cardinal area rather narrow, with a few grooves, bounded by a narrow ridge. Sculpture, in left valve, of 35 ribs about as wide as their intervals, crossed by concentric threads which are slender in the intervals, widened on the ribs. The right valve is like the left except that the concentric sculpture is slightly weaker. A few of the anterior ribs have a central sulcus. Hinge rather narrow, the tooth-row continuous, of 23 and 29 teeth.

Length 32, alt. 19, diam. of left valve 9 mm. (type).

" 33.5, " 20, " " " 11.25 "

Type No. 2859, A. N. S. P.

Besides a number of valves agreeing with the above description, there are two entirely similar except that they have 32 ribs.

***Arca (Scapharca) proletaria* n. sp.**

Shell oblong-trapezoidal, wider posteriorly, inflated, with rather large umbones, beaks at the anterior fourth. Cardinal area very narrow and bounded by a narrow ridge posterior of the beaks, wider and triangular in front of them. Ends of the hinge line angular. Anterior end rounded, posterior oblique. Sculpture of 35 ribs about equal to the furrows, in the left valve closely granose except on the posterior slope; interstices sharply but irregularly striate transversely. Right valve with some of the anterior ribs partly granose. Hinge with a continuous row of 15 + 31 teeth. Margin fluted.

Length of left valve 30, alt. 21, diam. 10 mm.

Type No. 2965, A. N. S. P.

There are 4 right and 4 left valves of this species, not paired. It is a decidedly broader shell than the preceding species but otherwise related.

***Arca dolaticosta* n. sp.**

The shell is extremely plump, almost equilateral, and equivalve. The ends of the hinge are slightly produced; posterior margin somewhat straightened, anterior and basal margins rounded. Beaks very prominent and full. Cardinal area broad (almost wholly concealed by hard shale). Sculpture of 25 high ribs bearing rather large, irregular nodes lengthened in the direction of the ribs. It is similar in right and left valves.

Length 65, alt. 63, diam. 66 mm.

Type No. 2738, A. N. S. P., from the shale of Chiriqui collected by Dr. John Evans.

Two specimens of this very distinct ark were found with the lot of *A. chiriquiensis*. The shape and sculpture are characteristic.

The shale bed at Chiriqui may perhaps be equivalent to the lower or lignitic bed at Tower N on the Canal and therefore Oligocene.

*Arca chiriquiensis*, Gabb, is probably *A. patrica*, Sowb. *A. grandis* also occurs in Santo Domingo.

***Arca (Scapharca) coccopleura* n. sp.**

A small, very obese nearly equivalve species with the postbasal angle somewhat produced, a rounded angle running to it, the beaks

full and prominent, curving well forward, at about the anterior fourth of the hinge line. Sculpture of 25 ribs, those of the left valve all closely granose, the grains rounded on the convexity, transverse towards the lower margin. Intervals sharply and finely striate transversely. On the anterior end the ribs are wider and more spaced. The right valve is similar except that it is very slightly smaller, and the granulation is weaker on and near the posterior ridge. Cardinal area is rather wide, with several concentric angulated grooves. Hinge line is rather short, with about 44 teeth.

Length 20.5, alt. 19.5, diam. 19 mm.

" 23.5, " 22, " of left valve 12 mm.

Type No. 2734, A. N. S. P.

This prettily sculptured species, known from numerous specimens, stands near *A. santarosana* Dall, but it differs by the smaller number of ribs, the anterior ones not being mesially grooved. *Arca alcima* Dall of the Pliocene has more ribs. In *A. rhombea* Hanley, *A. chemnitzii* Phil. and *A. pittieri* Dall, of the Pleistocene and recent faunas, the beaks turn forward less than in *A. coccopleura*.

***Arca tolepiea saxea* n. subsp.**

The shell is decidedly narrower than *A. tolepiea*, but with substantially the same sculpture; 33 ribs.

Length 31, alt. 24, diam. 23.3 mm.

Type No. 2742, A. N. S. P.

It is less abundant in the collection than *A. tolepiea*.

***Arca tolepiea scapularis* n. subsp.**

The posterior end is straightened, angular and somewhat produced above, subangular below, 33 ribs.

Length 29, alt. 22.5, diam. 21 mm.

Type No. 2739, A. N. S. P.

***Arca tolepiea crassicardinis* n. subsp.**

Similar to the typical form except that the hinge is very thick, 32 ribs.

Length 30, alt. 27, diam. 26 mm.

Type No. 2747, A. N. S. P.

***Arca cyclica* n. sp.**

Shell subcircular, plump, very thick, equivalve, with rather prominent nearly contiguous beaks at the anterior third of the length. Cardinal area extremely narrow behind the beaks, short but broader and triangular in front, with about two grooves. Posterior end broader than the anterior, an angle at its junction with the hinge

line. Ribs 35, about as wide as the intervals, granose in the left valve, the granulation obsolete in the posterior half of the right valve. Teeth 13 and 34, an irregularity where the anterior and posterior series meet. Edge fluted as usual.

Length 19.5, alt. 17.5, diam. 16.5 mm.; 35 ribs (type).

Length 22.3, alt. 22, diam. of right valve 9.5 mm.; 33 ribs (largest valve).

Type No. 2964, A. N. S. P.

This species is much less oblique than *A. tolepia*, and approaches more to a circular shape. It is known by 5 valves and one pair. The valves are remarkably thick.

***Area perfaceta* n. sp.**

The shell is nearly equivalve, inequilateral with large, inflated beaks at the anterior fourth; extremely globose. Lower-basal angle a little produced. Sculpture, in the left valve of 24 ribs about as wide as their intervals, and everywhere closely granose. Right valve having the ribs much narrower than their intervals, smooth in the median part, granose at the ends. Hinge rather short, with 13 teeth before, 25 behind an irregularity below the beaks. Margins deep'y fluted.

Length 20.5, alt. 21.5, diam. of left valve 11.3 mm.

Type No. 2726, A. N. S. P.

A much smaller, more obese *Argina* than *A. tolepia*. The nine valves in the collection belonged to as many individuals. The sculpture is particularly pleasing.

***Area pomponiana* n. sp.**

The shell is rather thin, inflated, very inequilateral, the beaks inflated, curving strongly forward, between the anterior fifth and sixth of the length. Cardinal area narrow and tapering behind the beaks, very short and wider in front, marked with one or two angulated grooves. Posterior end sloping, produced below. Sculpture of the left valve, 28 ribs wider than their intervals, and everywhere closely set with transverse granules. Right valve with the ribs narrower, about equal to the intervals, flat-topped and rather low and smooth except at the ends, where they are granose. Hinge slender, with many fine teeth.

Length 16, alt. 14.25, diam. of left valve 7.3 mm.

" 19, " 15, " " right " 9 "

Cotypes No. 2725, A. N. S. P.

Thinner, more oblique than the preceding species, and differing in details of sculpture. Five valves belong to as many individuals.

***Arca cuneolus* n. sp.**

The shell is thin, wedge-shaped, the anterior end short and very narrow, the posterior end very wide; beaks small, very convex the convexity narrow; situated at the anterior two-fifths, turning somewhat backward. Cardinal area small, not distinctly defined. Sculpture of the convex and posterior parts of the shell of radial flattened, partly bifid ribs alternating with narrow riblets, all roughened by transverse granules; the anterior part of the shell having fine riblets and minute concentric threads. Hinge narrow, the tooth-row continuous, of about 27 teeth, a group of very small ones under the beaks.

Length 8.8, greatest width 6.25, diam. of left valve 3 mm.

This peculiar species has a general resemblance in shape to *Macrondon asperula* Dall, *Arca* (*Cucullaria*) *endemica* Dall, and *Arca culebrensis* Smith. It differs widely from them in sculpture. We know of no nearly related species.

***Arca idiodon* n. sp.**

The cast is oblong, slightly wider posteriorly, with the beaks very close to the anterior end, full and prominent, and so near together that the beaks of the shell must be closely contiguous. Hinge-line, as indicated by a narrow ridge in the cast, is gently arcuate from the posterior end nearly to the beaks. Just below and anterior to the beaks it bends rather deeply downwards and the teeth, as indicated in the cast, are comparatively large. There seems to be about seven of these enlarged teeth in the short, downwardly-curved anterior arc. Immediately behind this arc there is a space where the teeth seem to have been very small and irregular. The rest of the hinge seems to have had moderately small, regular teeth, indicated by crenulations in the cast. The lateral surfaces of the cast has low, irregular concentric waves and numerous very shallow radial impressions. The anterior border is distinctly crenulated, but elsewhere the internal borders of the valves would appear to have been smooth.

Length 69.6, alt. 48, diam. 38 mm.

Quarry near Wilmington, North Carolina. Type No. 12475, A. N. S. P., collected by Mr. Joseph Willcox.

This peculiar ark differs widely from all Tertiary species known to us. The double curve of the tooth-row, with enlarged teeth on its short anterior arc, is a more specialized structure than we have found in the species compared. The recent *A. campechensis* Dillw. *americana* Gray, approaches nearer to *A. idiodon* than any other known to us.

Besides the peculiar hinge, this species is notable for its strongly

anterior, contiguous beaks, the absence or weakness of crenulation along the basal margin, and the concentric waves of the surface of the cast. The shell when found will probably prove to be thin for an *Arca*. Its strong individuality will permit ready recognition of this species, which we know from a single quite perfect cast.

***Glycymeris santodomingensis* n. sp.**

*Axinæa sericata* Reeve, Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 255.

The orbicular shell is rather convex, solid; anterior end broadly rounded, the posterior end more narrowly so. Sculpture of 22 convex ribs, widest in the middle and anteriorly, much narrower on the posterior third. Hinge broad, with 10 anterior and 13 posterior teeth; median teeth subobsolete; sulci of the lower margin extremely shallow, almost obsolete. Posterior adductor scar bounded by an acute ridge anteriorly.

Length and alt. 37, semidiameter 11 mm.

Type No. 2654, A. N. S. P.

Gabb identified this species with a little known recent form, which differs in number of ribs, etc. In *G. lloydsmithi* P. & B. the ribs are much flatter, the hinge more curved, and the internal margin has strong v-shaped teeth.

***Glycymeris diffidentiae* n. sp.**

*Axinæa pennacea* Lam., Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 255.

The shell is slightly inequilateral, rather convex, the posterior end more narrowly rounded and more produced than the anterior. Sculpture of low but distinct radial ribs in the median part, obsolete at the ends; over all are fine radial striæ, about six striæ (five to seven) between crests of the ribs; these are crossed by regular but extremely minute concentric striæ, which pit the grooves between the radial striæ, when the surface is unworn. Hinge is little curved, with tooth-row of 14, 15 teeth. The margin has rather strong, short teeth.

Length 20, alt. 16.7, semidiameter 7 mm. (type).

" 21, " 18.7, " 7 " (largest valve).

Type No. 2653, A. N. S. P., with 11 other valves.

The Bowden *G. jamaicensis* has a decidedly different sculpture, and fewer much larger teeth in specimens of the same size. The recent *G. lineatus* (Reeve) has much the same sculpture, but it differs in the teeth and in outline.

***Ostrea bolus* n. sp.**

The shell is small, usually subtriangular, the deep valve having the beak strongly curved as in some *Gryphæas*, exterior with a few

irregular ribs which do not affect the margin (and are sometimes wanting). Cardinal area oblique; no crenulation of the margins near the hinge or elsewhere. Upper valve with the beak oblique, cardinal area rather long.

Greatest length (alt.) 33, width 27 mm.

Type No. 2633, A. N. S. P., from between Las Caobas and Thomonde, Haiti, collected by Mr. Lloyd B. Smith, 1914.

**Anomia gabbi** n. sp.

*Anomia ephippium* Linn., Gabb.

Very similar to the European *A. ephippium*. Externally the convex valve has a coarse sculpture of radial ribs, with radial riblets and striæ in the intervals. The byssal impressions are distinctly but not deeply impressed, but sufficiently to be readily seen or felt. Major impression somewhat square; minor impression close below it and not greatly smaller. Adductor impression alongside the minor byssal scar, not lower down. The shell is orbicular, and somewhat stronger than *A. ephippium* or *A. simplex*. Alt. 48 mm.

Type No. 2642, A. N. S. P.

There is the fragment of another valve, having the external sculpture less uneven though equally coarse.

**Pecten plurinominis** n. sp.

*Pecten oxygonum* Shy., Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 256. Not of Sowerby.

*Pecten thetidis* Sowerby, Dall, Trans. Wagn. Inst., III, p. 714. Not of Sowerby.

In this scallop there are 19 rounded ribs a little wider than their intervals, over ribs and intervals there are weak radial cords bearing thin scales, near the edge of the left valve there are three of these scaly cords upon each rib and three in each interval. Submargins and ears with numerous small ribs. Ctenolium is rather long. The right valve is slightly more convex than the left.

Length and alt. 31 mm.

Type No. 3236, A. N. S. P.

This species resembles the recent *P. fuscopurpurea* Conrad in sculpture, but the ribs are not so strong and the ears are much smaller. In our opinion it cannot be either *P. oxygonum* or *P. thetidis* of Sowerby. Whether it is specifically separable from several forms found in the Canal Zone and Costa Rica is uncertain, but there are various differences which indicate at least racial distinction. Typical specimens occur in some abundance in the Bowden bed also.

**Pecten uselmæ** n. sp.

*Pecten inæqualis* Sowerby, Guppy, Q. J. Geol. Soc., XXII, 1866, p. 294, Pl. 18, fig. 6. Not of Sowerby.

The shell is inequilateral, inequivalve, the left valve is larger, conspicuously surpassing the right throughout the lower margin and ends. It is strongly convex; the right valve weakly so. Sculpture of 17 rounded ribs. In the left valve these are wider than the intervals, which are deeply cut, with concave bottoms, which are closely sculptured with delicate transverse threads. In the right valve the ribs are lower, and not quite as wide as the intervals, in which the transverse striation is often weak. The submargins are smooth. Ears with several ribs. Ctenolium is very short, of three teeth, which are small in adult shells. Cardinal crura strong, vertically striate.

Length of left valve 28, alt. 27.3, diam. 8.25 mm.

Type No. 11124, A. N. S. P., from Bowden, Jamaica, collected by Mr. Uselma C. Smith.

This species is noticed here because it has been identified as *P. inæqualis* Sowb. of Santo Domingo. It differs from that by having fewer, stronger ribs in the left valve and more strongly ribbed ears. The left valve is more convex, and the form more inequilateral. Having seen large series of both, we find these differences constant. It is not represented in our Santo Domingan collections.

**Pecten (Amusium ?) correctus** n. sp.

*Pecten opercularis* Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 256.

The shell is orbicular, weakly convex, with sculpture of 21 extremely low, weakly convex ribs, over which growth-lines are visible. Ears plain, subequal, separated from the rest of the valve by undercut grooves:

Alt. 52, semidiameter about 6.5 mm.

Type No. 2781, A. N. S. P.

**Pecten ischnon** n. sp.

The shell is delicate, very thin, much compressed, inequilateral, the right valve slightly more convex. Sculpture of 19 very low rounded ribs, and extremely delicate, fine and close concentric striation, strongest between the ribs. Ears rather large, with a few delicate riblets in the right valve. The left valve has 5 strong, crenulated ribs on the posterior ear. Ctenolium well developed. Both valves are strongly furrowed radially inside, the edges of the intervening elevations a little raised, thickened.

Length of right valve 23, alt. 23, diam. 3.5 mm.

Type No. 2780, A. N. S. P.

The collection contains five left and six right valves.

***Crenella diuturna* n. sp.**

*Crenella divaricata* d'Orb., Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 252.

The shell is small, rounded-oval, resembling *C. duplinensis* Dall, but differing by the somewhat greater inflation, and by having regularly spaced, concentric threads over the rather fine divaricate ribbing. Hinge much more delicate than in *C. divaricata* (Orb.); crenulation of the valve-margins short and very weak.

Length 1.85, alt. 2.3, diam. 1.5 mm.

The line of divarication is well out of the median line. Several valves agree in characters of form and sculpture.

***Crenella rota* n. sp.**

The shell is rather convex, almost circular, having rather fine low ribs divaricating at a small angle from the median line, and crossed by numerous weak concentric threads. Valve margins very strongly crenulated.

Length 1.8, alt. 1.95, diam. 1.4 mm.

Type No. 2753, A. N. S. P.

Distinguished by its subcircular outline.

***Cuspidaria ornatior* n. sp.**

*Neæra ornatissima* d'Orb., Gabb, Trans. Amer. Philos. Soc., XV, p. 248.

The shell resembles *C. ornatissima* (Orb.), but has much more numerous radial ribs, 22 in the type; on the anterior half they are subequal, evenly spaced and blunt. Concentric wrinkles along growth-lines are rather well developed in places.

Length 4.75, alt. 2.7 mm.

Type No. 2790, A. N. S. P. There are broken valves indicating a considerably larger size.

***Cuspidaria gabbi* n. sp.**

*Neæra alternata* d'Orb., Gabb, Trans. Amer. Philos. Soc., XV, p. 248.

The shell is plump, with elevated, nearly central beaks, much attenuated behind, rostrate, the upper margin sloping and nearly straight before, very deeply concave behind the beaks. Basal margin is incurved posteriorly. There are about 30 radial ribs, the posterior one largest and a little more widely separated from its neighbor; following 4 or 5 ribs of intermediate size, the rest smaller, subequal, and not reaching nearly to the beaks.

Length 8, alt. 5.4, semidiameter 2.5 mm.

Type No. 2791, A. N. S. P.

Near *Sphena alternata* Orb., but the dorsal border is much more concave behind the beaks.

**Crassatellites (Crassinella) microdelta** n. sp.

*Gouldia martinicensis* d'Orb., Gabb, Trans. Amer. Philos. Soc., XV, p. 252.

The shell is subtriangular, the anterior and posterior slopes forming a right angle, basal margin strongly curved; lunule and escutcheon narrow, flattened, smooth; sculpture of strong, regular, rounded concentric ribs, about 19 visible in a lateral view of the valve, seven in 1 mm. measured upward from the basal margin.

Length 2.6, alt. 2.5, semidiameter 0.6 mm.

Type No. 3229, A. N. S. P.

According to the figures, Orbigny's *Crassatella martinicensis* has coarser, more widely spaced ribs. There is, however, a recent Antillean species which resembles this Oligocene form closely in sculpture.

**Crassatellites (Crassinella) dolatus** n. sp.

The shell is rather convex, the anterior slope straight, posterior convex; lunule is somewhat sunken and large; escutcheon narrow. Sculpture of coarse rounded concentric ribs much wider than their intervals, 15 being visible on a valve, five in 1 mm., measured upward from the basal margin. In the valleys very minute crowded radial striae are seen.

Length 3, alt. 3, semidiameter 1 mm.

Type No. 3230, A. N. S. P.

This species differs from the preceding by its much coarser sculpture, larger, more distinctly defined lunule, and greater convexity.

**Venericardia aversa** n. sp.

The shell is small, extremely plump, higher than long, with very large, strongly prosogyrate beaks, and no lunule. Sculpture of 18 strong tuberculiferous ribs equal to the interstices. Cardinal tooth very high and thin, the socket correspondingly of unusual depth, narrow. The inner margin is very strongly fluted, and there is a pit under the end of each rib.

Length 12, alt. 12.5, semidiameter 6.3 mm.

Type No. 3215, A. N. S. P.

This small species is well characterized by the inflated form (the diameter being about equal to the length), by the long cardinal tooth and deep socket, and the large beaks. Valves of two individuals, right and left, are in the collection.

**Venericardia santodomingensis** n. sp.

*Cardita scabricostata* Guppy, Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 252. Not of Guppy.

The shell is rounded-oval, the length very slightly exceeding the altitude, beaks very near the anterior end; lunule moderately sunken and rather large. Sculpture of 22 or 23 subacute ribs bearing small, somewhat transverse granules, the intervals between the ribs broad, concave, irregularly striated transversely. Hinge and basal margin as in *V. scabricostata* (Guppy).

Length 21.7, alt. 21.3, semidiameter 9 mm.

Type No. 3214, A. N. S. P.

This species is closely related to *V. scabricostata*, but differs by having more ribs, which are narrower with wider intervals; it is rounder, and higher relative to the length. We find these differences constant in large series of both examined. It has some resemblance to the young of *V. hadra* Dall, but that seems to be a heavier, far more coarsely sculptured shell, when specimens of equal size are compared. The Chipolan species reaches a far greater size than *V. santodomingensis*.

**Echinochama trachyderma** n. sp.

*Chama arcinella* Linn., Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 251.

Shell resembling *E. antiquata* Dall in shape, but differing by having fewer radial ribs (8 to 12), which are only sparsely spinose; surface very closely and strongly tuberculate, the tubercles sometimes anastomosing into a netted pattern in places.

Length 55.5, alt. 61.5, diam. 43.5 mm.

Type No. 2766, A. N. S. P.

The comparison of long series of excellently preserved shells from Bowden and Santo Domingo shows no intergradation between *E. antiquata* and this species.

**Phacoides perplexus** n. sp.

*Lucina antillarum* Reeve, Gabb, Trans. Amer. Philos. Soc., XV, p. 251.

The shell is small, orbicular, not very inequilateral, with sculpture of numerous (about ten) rounded radial ribs, which gradually diminish and partly disappear on the lower third of the disk, crossed by many close, fine, obtuse and slightly waved concentric threads. Lunule distinct, somewhat sunken. Hinge with two cardinal teeth but no laterals in the left valve. Anterior muscle scar long. Internal margin crenulated.

Length 7, alt. 6.7, diam. left valve 2.3 mm.

With a hinge like *Lucinoma*, this species has external sculpture

resembling *Codakia* (*Jagonia*) *antillarum* (Rve.) Gabb's specimen, No. 3324 A. N. S. P., a single valve, is not identical with *Codakia vendryesi*, as Dr. Dall supposed.

**Phacoides (Parvilucina) pupulus** n. sp.

*Lucina crenulata* Conr., Gabb, Trans. Amer. Philos. Soc., XV, p. 251.

This is a species of the *crenulata* group, differing from the type of *crenulata* Conr. (No. 2718, A. N. S. P.) by its far smaller size, thinner concentric lamellæ and the relatively coarser, low and rounded radial sculpture, which appears much more prominent when the concentric lamellæ are worn off. The lunule is relatively larger, very deep; finally the teeth are heavier and the marginal crenulation coarser for the size.

Length 2.8, alt. 2.7, diam. of one valve 1.05 mm.

Type No. 3323, A. N. S. P., with five other valves.

**Divaricella proleteria** n. sp.

*Lucina dentata* Wood, Gabb, Trans. Amer. Philos. Soc., XV, p. 251.

The shell is thin, plump, subcircular, equilateral, with sculpture of the usual *Divaricella* pattern, the grooves widely spaced for so small a shell. There are several strongly marked grooves of growth-arrest in large specimens. The inner margin is finely crenulated, the hinge-line strongly arched, and not angular at the ends.

Length 8.75, alt. 8.25, diam. of one valve 3 mm.

Type No. 2754, A. N. S. P.

This species is represented by over 20 valves. It is related to *D. quadrisulcata* (Orb.), but differs by the much smaller size, plumper form, far more curved hinge-line, and the relatively coarser sculpture.

**Lucina mauryae** n. sp.

The shell is compressed, the diameter about half the length, orbicular, with the small beaks near the anterior third of the length. In front of the beaks the shell is produced in a thin wing. There is a small lunule defined by a groove in the right valve, none in the left. The dorsal area is defined by a slight furrow in both valves; surface delicately striate concentrically.

Length 36.5, alt. 33.5, diam. 19 mm.

The valves are a few millimeters apart at the lower edge; if in contact the diameter would be at least 1 mm. less. The compressed shape is characteristic.

**Diplodonta dedecoris** n. sp.

The shell is thin, with rather small, pointed beaks, and inconspicuous sculpture of fine, irregularly developed concentric striæ,

over which there is a most minute granulation. Posterior end very short, broadly rounded. Anterior end produced, also broadly rounded, both cardinal teeth bifid.

Length 1.5, alt. 1.35, semidiameter 0.35 mm.

Type No. 2758, A. N. S. P.

Similar to *D. minor* Dall, but of less oblique, more rounded outline.

***Chione santodomingensis* n. sp.**

The shell resembles *C. chipolana*, but differs as follows. It is shorter and higher, the dorsal and anterior slopes forming a smaller angle. The concentric laminae are widely spaced, and continue over the lunule. The radial sculpture produced by splitting of the ribs is less even. There are fewer concentric ribs than in *C. chipolana* of the same size.

Length 17.4, alt. 16.4, semidiameter 5.7 mm.

Type No. 2777, A. N. S. P.

We have compared this with a long series of *C. chipolana* from the type locality, and have no doubt of its distinctness, though there is a general similarity.

***Chione socia* n. sp.**

The shell resembles *C. woodwardi* Guppy in size and shape, as well as in the lunule, over which the concentric lamellæ run. It differs by the radial sculpture. In *C. woodwardi* the radial ribs run to the basal border, gradually enlarging. In *C. socia* these ribs, at first similar, soon become smaller, low and slender, and towards the margin they split, so that there are very many more, and smaller ribs. Crenulations of the internal basal margin are smaller and twinned.

Length 21, alt. 19, diam. 14 mm.

Type No. 2778, A. N. S. P.

This form shows a particular sculpture not found in the common *C. woodwardi* of the Bowden bed, which appears not to occur in Santo Domingo. In *C. santodomingensis* the concentric lamellæ are much more widely spaced.

***Chione primigenia* n. sp.**

Related to *C. cancellata* and *C. chipolana*. The radial sculpture is coarser than in *chipolana*, the beaks are nearer the anterior end, and the tooth-plate is decidedly broader. The posterior end is more prolonged and cuneate than in *C. cancellata*, the concentric ribs are more delicate, the lunule far wider than *cancellata* of equal size and the beaks more anterior.

Length 26, alt. 21.6, semidiameter 8.2 mm.

Type a right valve, No. 2782, A. N. S. P.

***Cyclinella cyclica domingensis* n. subsp.**

*Cyclina cyclica* Guppy, Gabb, Trans. Amer. Philos. Soc., XV, p. 250.

? *Dosinia cyclica* Guppy, Q. J. Geol. Soc., XXII, 1866, p. 582, Pl. 26, figs. 15a, b.

According to Guppy, the lunule is entirely wanting in his species, but Dall, who has examined the types, states that it is large and lanceolate, and there is "a close concentric sculpture of fine, sharp, somewhat elevated lines" (Wagn. Trans. III, 1285). In the Santo Domingo specimen (No. 2755), an excessively faint impressed line defines the lunule, which is about 7 mm. long, 3 wide. The sculpture consists of unequal, unevenly developed flat growth-ripples, which on the posterior dorsal slope become fine but not much elevated threads.

Length 28.7, alt. 26.5, diam. 14 mm.

As the single specimen seems to differ somewhat from the account of Guppy's species, we prefer to treat it as a variety.

Dall stated that the type of *D. cyclica* Guppy was a *Lucinopsis* (*Proc. U. S. N. Mus.*, XIX, 329), but later (*Trans. Wagn. Inst.*, III, 1285) he placed it in *Cyclinella*.

Type No. 2755.

***Dosinia azuana* n. sp.**

The shell resembles *D. elegans*, but is somewhat plumper, with the concentric grooves more widely spaced, strong throughout. The sculpture is not laminar at the ends. Lunule as in *D. elegans*.

Length 39, alt. 38, diam. 20 mm.

West of Azua, collected by Mr. L. B. Smith.

Type No. 2685, A. N. S. P.

***Semele delimata* n. sp.**

The shell is compressed with small, inconspicuous beaks near the middle, lunule rather deep. Anterior end broadly rounded, posterior end more produced and narrower. There are rather sharp growth-striae near the lower margin, elsewhere smooth.

Length 47, alt. 38.5, diam. 20.5 mm.

It is related to *S. silicata* Dall, a smaller, more sharply sculptured species.

***Semele firma* n. sp.**

Closely related to *S. sardonica* Dall, but of a less wide, ovate outline; lunule deep and narrow; escutcheon narrow, about equally

developed in both valves. Sculpture of sharp, low, thread-like concentric lamellæ without interstitial striae.

Length 31, alt. 22.5, diam. about 11 mm.

Both of these species of *Semele* are apparently from the *Orthaulax* bed, having the same hard matrix. They stand close to Ballast Point species, yet are evidently distinct.

**Tellina (*Merisca*) *errati* n. sp.**

*Tellidora crystallina* Chemn., Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 249.

The shell is compressed, with nearly median beaks, the dorsal slopes on either side straight. Anterior end broadly rounded, posterior end acute; lower margin strongly arched, a little incurved near the posterior end. The right valve has an angular ridge below the posterior upper margin, followed by a radial concavity. Left valve with a slight concavity below the same margin. The surface is matt, with sculpture of delicate, regularly and rather widely spaced laminar concentric ribs. In the intervals there is very fine radial crinkling, the wrinkles partly converging upwards into many little groups. The pallial sinus extends nearly to the anterior adductor scar, and is con crescent below with the pallial line. Lateral teeth well developed in the right, wanting in the left valve.

Length 13, alt. 9, diam. of left valve 2 mm.

Type No. 2666, A. N. S. P.

Gabb's identification of this species was really remarkable. There are two left valves and a broken right valve, the latter larger, indicating a length of 17 or 18 mm.

***Metis efferta* n. sp.**

The beaks are nearly central, left valve more convex, being plump throughout, right valve plump anteriorly, then broadly concave, strongly angular posteriorly. Surface very lightly striate with periodic marks of growth-arrest, and on the anterior and posterior areas there are fine laminæ like those of *M. chipolana*. Radial striation is fine and superficial.

Length 36, alt. 30.7, diam. 17 mm.

Type No. 2665, A. N. S. P.

Related to *M. chipolana*, but readily distinguishable by the much plumper form, broader and deeper concavity of the right valve, and presence of little laminæ only on the ends. The valves are slightly skewed. If evenly placed the diameter would be about 18 mm.

**Metis postrema** n. sp.

This species is closely related to *M. chipolana* and *M. efferta*, but differs from both by its relatively greater length.

Length 36, alt. 28.7, diam. about 14 mm.

Type No. 2760, A. N. S. P. Two other specimens.

Whether further series will show that these three supposed species intergrade we cannot tell. With the material before us, they seem sufficiently distinct. All were labelled *Macoma constricta* Brg. by Gabb. It was a wild shot, even for him.

**Labiosa (Raeta) gabbi** n. sp.

*Raeta canaliculata* Say, Gabb, Trans. Amer. Philos. Soc., XV, 1873, p. 248.

The shell is oval-subtriangular, the beaks nearer the anterior end; sculptured with small concentric ribs which are weaker in the middle, where there is a slightly depressed, quite inconspicuous, wedge-shaped area radiating from the beaks. Beaks small, turned forward a little, smooth. Posterior end rounded, somewhat compressed, the contour in dorsal view being somewhat wedge-shaped. Hinge not exposed.

Length 28, alt. 23, diam. 13.8 mm.

Type No. 2675, A. N. S. P.

As the shape, sculpture and size differ conspicuously from *L. canaliculata*, it is not easy to account for Gabb's identification. It is also obviously unlike *L. alta* (Conr.). Besides the specimen mentioned by Gabb, five others were found in unassorted material.